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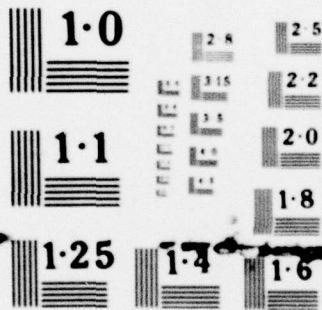
NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. PHOENIX DAM-LOCK 1 (INVENTORY NUMB--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

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OSWEGO RIVER BASIN

PHOENIX DAM-LOCK 1

OSWEGO COUNTY
NEW YORK

INVENTORY NO NY 773

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1979

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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Phoenix Dam-Lock 1 Oswego River Basin, Oswego County, New York Inventory No. 773		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
6. AUTHOR(s) John B. Stetson, P.E.		6. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
7. PERFORMING ORGANIZATION NAME AND ADDRESS Stetson-Dale Engineering Company Bankers Trust Building Utica, New York 13501		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Con- servation/ 50 Wolf Road Albany, New York 12211		12. REPORT DATE 28 September 1979
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007		13. NUMBER OF PAGES
15. SECURITY CLASS. (of this report) UNCLASSIFIED		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; Distribution unlimited.		
17. <div style="border: 1px solid black; padding: 5px;">National Dam Safety Program. Phoenix Dam-Lock 1 (Inventory Number NY773), Oswego County, New York. Phase I Inspection Report.</div>		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Phoenix Dam-Lock 1 Oswego County Phoenix		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or proper- ty. However, additional studies should be undertaken to further evaluate con- ditions affecting the dam. <i>These include: (Cover)</i>		

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cont

- (1) Within one year of notification, complete the following investigations:
 - a. Perform additional stability analysis on the dam, since the resultant force for the ice loading condition falls outside the middle third of the base of the dam. This additional analysis should include borings to supply data determining uplift pressure. *Investigation of*
 - b. Investigate the structural condition of the tainter gate system or initiate action to replace it, *and evaluation of the*
 - c. Evaluate effects of overtopping and assessment of a dam failure potential at the abutments and flooding due to the 1/2 PMF; *and*
- (2) The remaining deficiencies requiring remedial work should be completed within the next constructed season. The following improvement needs have been identified:
 - a. Complete remedial work which may be required as a result of the investigations.
 - b. Repair or replace the tainter gate system.
 - c. Repair deteriorated concrete at the abutments.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity at 32,500 cfs which is 40 percent of PMF. The PMF and 1/2 PMF flows are 81,900 cfs and 46,800 cfs respectively. The spillway is therefore inadequate to pass the PMF. The spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the dam is a gravity structure, and the stability analysis indicate that the dam is stable during the 1/2 PMF event. Three historic events in 50 years of record have likely overtopped this structure.

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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TABLE OF CONTENTS

	<u>Page</u>
Preface	
Assessment of General Conditions	i-ii
Overall View of Dam	iii-viii
Section 1 - Project Information	1-4
Section 2 - Engineering Data	5
Section 3 - Visual Inspection	6-7
Section 4 - Operational Procedures	8
Section 5 - Hydrologic/Hydraulic	9-12
Section 6 - Structural Stability	13-17
Section 7 - Assessment/Remedial Measures	18-19

FIGURES

Figure 1 - Location Map
Figure 2 - Appropriated Lands
Figure 3 - Contract 53, Layout and Profile
Figure 4 - Contract 53, Plan and Elevation Lock 1.
Figure 5 - Contract 53, Location Plan and Section of Dam
Figure 6 - Contract 80, Details of Steel Flashboards
Figure 7 - Contract 80, Details of Steel Operating Platform
Figure 8 - Contract 80, Details of Gates and Valves
Figure 9 - Contract 80, Detail Plans and Sections of North Headgates
Figure 10 - Contract 80, Detail Plans and Sections of South Headgates
Figure 11 - Contract 80, Details of Movable Dam
Figure 12 - Contract 80, Cross Sections for Head- gates and Dam
Figure 13 - Control Structure at Lock 0-1
Figure 14 - Discharge Frequency Curve

APPENDIX

Field Inspection Report	A
Previous Inspection Reports/Relevant Correspondence	B
Hydrologic and Hydraulic Computations	C
Stability Analysis	D
References	E

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Phoenix Dam at Lock 1, NY773

State Located New York
County Located Oswego
Stream Oswego River
Date of Inspection June 7, 1979


ASSESSMENT OF
GENERAL CONDITIONS

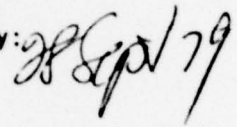
Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

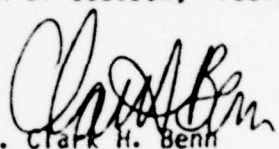
1. Within one year of notification, complete the following investigations:
 - a. Perform additional stability analysis on the dam, since the resultant force for the ice loading condition falls outside the middle third of the base of the dam. This additional analysis should include borings to supply data determining uplift pressure.
 - b. Investigate the structural condition of the tainter gate system or initiate action to replace it.
 - c. Evaluate effects of overtopping and assessment of a dam failure potential at the abutments and flooding due to the 1/2 PMF.
2. The remaining deficiencies requiring remedial work should be completed within the next constructed season. The following improvement needs have been identified:
 - a. Complete remedial work which may be required as a result of the investigations.
 - b. Repair or replace the tainter gate system.
 - c. Repair deteriorated concrete at the abutments.

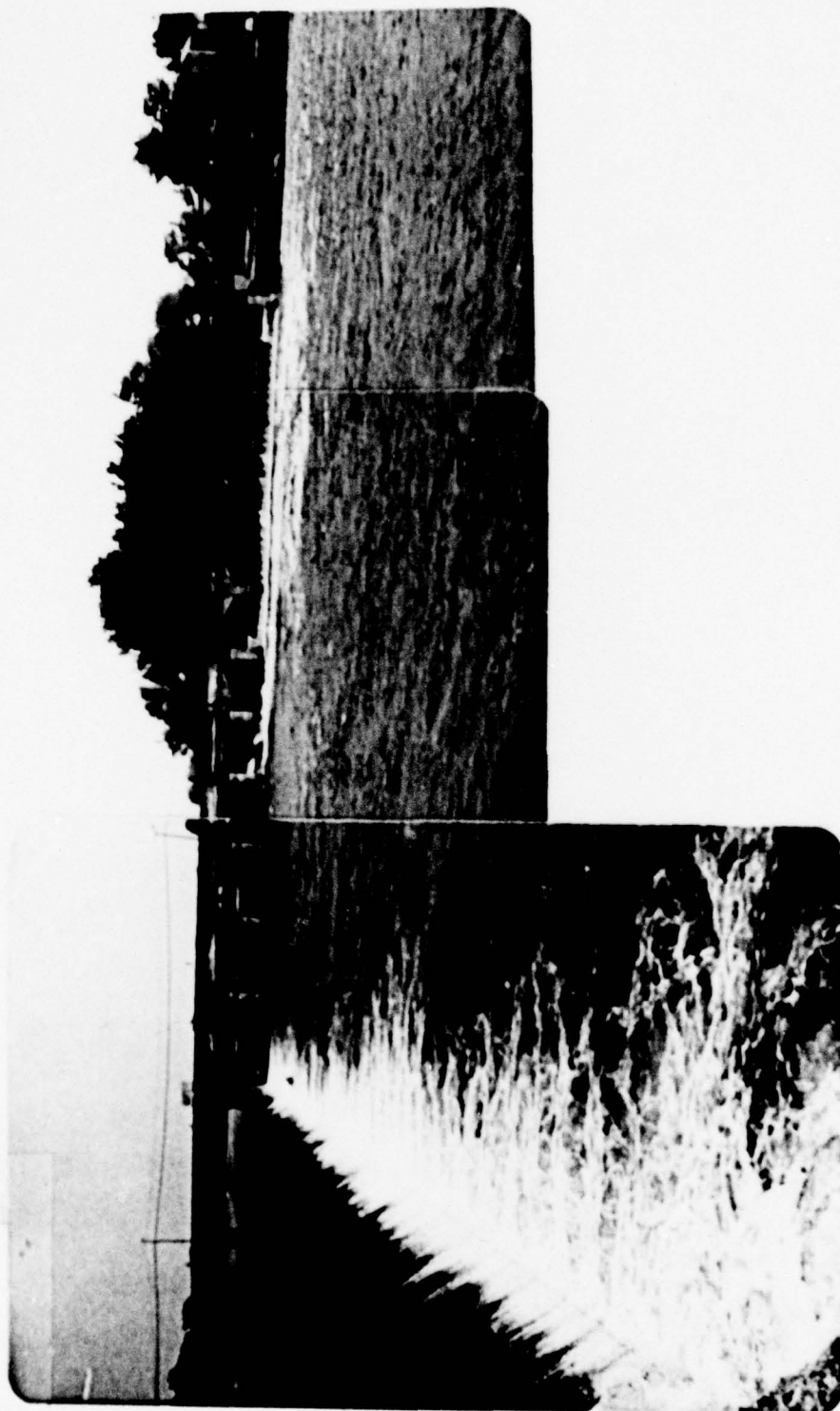
Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity at 32,500 cfs which is 40 percent of PMF. The PMF and 1/2 PMF flows are 81,900 cfs and 46,800 cfs respectively. The spillway is therefore inadequate to pass the PMF. The spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the dam is a gravity structure, and the stability analysis indicate that the dam is stable during the 1/2 PMF event. Three historic events in 50 years of record have likely overtopped this structure.

Dale Engineering Company

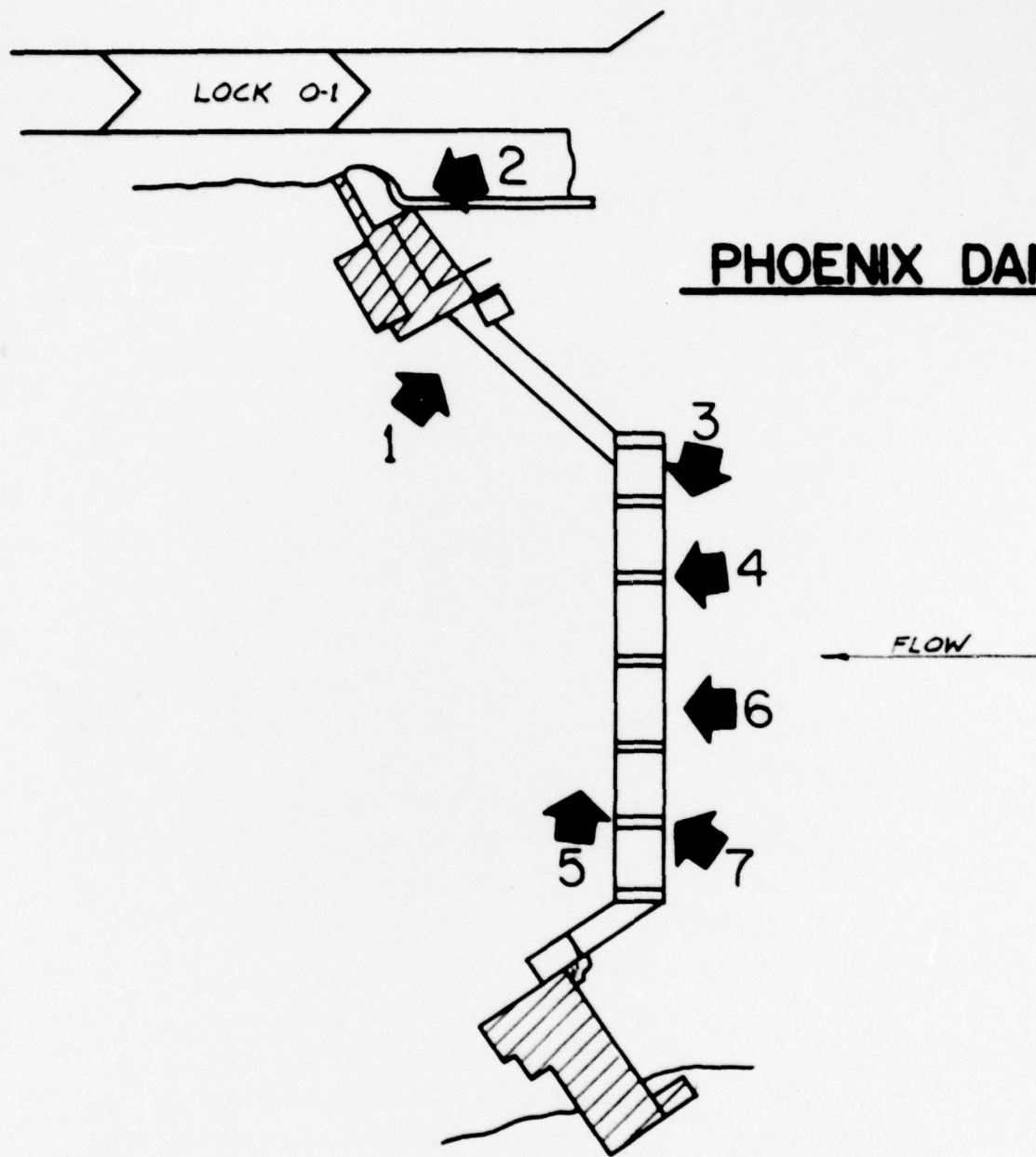

John B. Stetson, President

Approved By: 
Date: 28 Sept 79


Col. Clark H. Benn
New York District Engineer



Overview of concrete gravity dam at Lock 0-1 on Oswego River
at Phoenix, New York.



PHOENIX DAM



PHOTOGRAPH KEY MAP



STETSON • DALE

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DRAWN

JAG

APP'D

iv



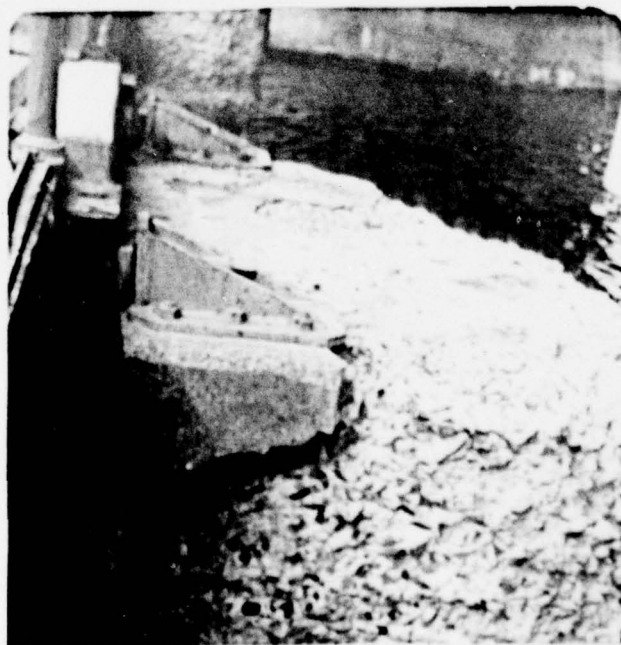
1. Closeup of deteriorated spillway section adjacent to entrance to Lock 0-1 located on east side of river.



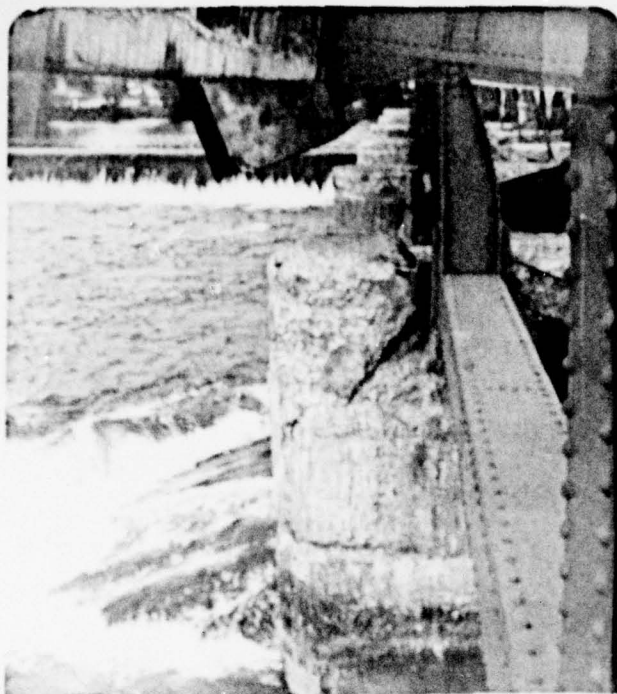
2. Sluice gates to auxiliary discharge canal adjacent to Lock 0-1 on east side of river.



3. Tainter gates operated with manual rack and pinion. Gates have substantial corrosion on members and plate area. Notice tension bar installed and tied back to concrete soldier beam from gate support as can be seen along top of pier.



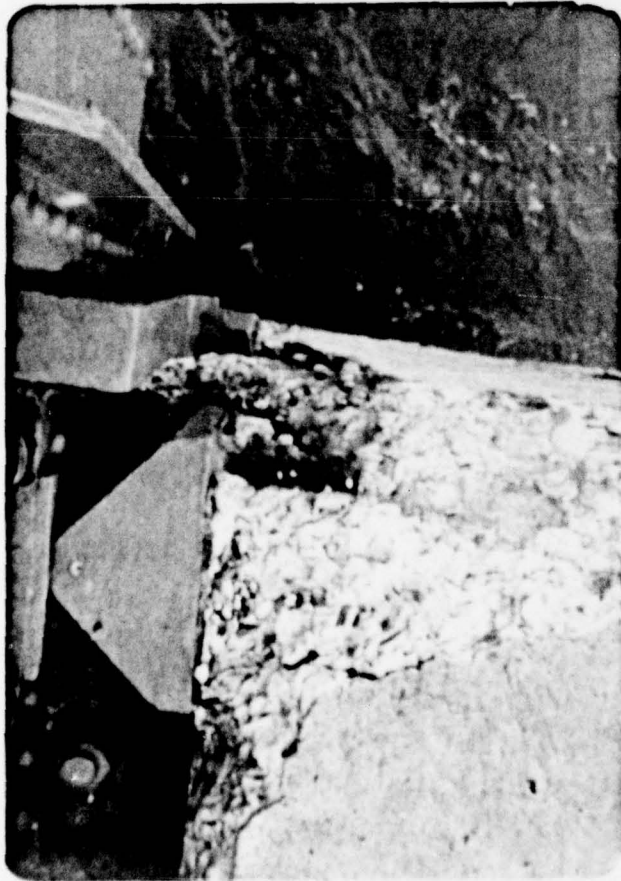
4. Detail of hold down plate along upstream side of tainter gates. Condition of concrete is typical to all six tainter gates apparently offering little resistance to uplift forces. Horizontal forces towards downstream, resisted by pier concrete. See Picture 3, left portion below manual control device.



5. Views of second pier from west side showing sheared concrete pier section on both sides. Apparently, crack goes clear through section. Notice double tension rods in right picture located at foot of dam inspector.



6. Counterbalance with large crack in concrete.



7. Closeup of deteriorated concrete at tainter gate support. Vertical dead load of gate is supported on pier which is in partially deteriorated concrete.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - PHOENIX DAM - LOCK NO. 1 ID# - NY773

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and the New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Phoenix Dam - Lock No. 1 and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Phoenix Dam at Lock No. 1 on the Oswego River consists of a series of structures. Lock No. 1 is situated along the east bank of the river immediately downstream from the Lock Street Bridge in the Village of Phoenix. The west wall of the lock is founded on a small island, upon which are located a number of industrial-type buildings. The island is divided by an abandoned raceway to what may have been a power generating station on the island. The gates controlling the flow into the forebay of the power generating station are presently in a closed position, although some small amount of seepage takes place around these gates. There are some deteriorated industrial buildings along the west bank of this island. The principal spillway structure begins at the southwest corner of the island and extends in an upstream direction approximately 390 feet to a tainter gate structure, which is constructed just downstream from the Lock Street

Bridge. This spillway structure is a concrete gravity dam 11 feet in height across the crest shaped spillway. The tainter gate structure runs perpendicular to the flow of the river. It consists of six tainter gates, each with separate mechanical operators. At the west end of the tainter gate structure, a second overflow weir-type concrete gravity dam extends to the west bank of the river. This overflow weir is also oriented in a skewed downstream direction. On the west bank of the river is situated an abandoned sluice gate structure which formerly served a power generating facility but has since been demolished. Plans indicate that this structure is founded entirely on bedrock. The dam is the first in a series of six dams which regulate flow in the Oswego River for use in navigation and power generation.

b. Location

The Phoenix Dam is located in the Village of Phoenix and in the Towns of Schroepfel in Oswego County and the Town of Lysander in Onondaga County, New York.

c. Size Classification

The maximum height of the dam is approximately 12 feet. The storage volume of the impoundment is approximately 5500 acre feet.* Therefore, the dam is in the Intermediate Size Classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Oswego River flows through the Village of Phoenix and through the Cities of Fulton and Oswego. The Oswego River is also used for navigational and recreational purposes. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New York State Department of Transportation.

Waterway Maintenance Subdivision:

Region Three:

New York State - DOT
Main Office - State Campus
1220 Washington Avenue
Albany, New York 12232
Director - Mr. Joseph Stellato
(518) 457-4420

New York State - DOT
Syracuse State Office
333 E. Washington Street
Syracuse, New York 13202
Engineer - Mr. Leo Burns
(315) 473-8194

*This is the volume of the navigable river channel 15 miles in length, 300 feet in width and an average of 10 feet in depth.

f. Purpose of the Dam

The dam is used to regulate flows in the Oswego River for navigational use and power generation. The Oswego River is also used for recreational purposes.

g. Design and Construction History

The dam was constructed in approximately 1914.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation. The main function of this facility is to provide adequate pool elevations for navigation in the Oswego Canal. The secondary function of the facility is to maintain flows for power generation at the Niagara Mohawk Power generating facilities, located downstream in the Oswego River. In order to fulfill the primary function of the facility, navigation, it is necessary to maintain the upstream water level at the elevation of the spillway crest. The tainter gates which control the flow through this facility are manipulated to provide downstream water for power generation.

1.3 PERTINENT DATA Elevations: Barge Canal Datum (USGS +0.99 Feet)

a. Drainage Area

The drainage area of Phoenix Dam - Lock No. 1 is 4956.27 square miles.

b. Discharge at Dam Site

Peak discharge records at USGS Gage 0424900, 16 miles downstream

28 March 1936	37,500 cfs
10 April 1940	35,000 cfs
27 June 1972	32,300 cfs

(See Appendix for other values for annual peaks.)

Computed Discharges:

(Tainter gates closed)

Ungated Spillway, Top of Dam	57,500 cfs
Ungated Spillway, Top of Lock	32,500 cfs
PMF	81,900 cfs
1/2 PMF	46,800 cfs
Maximum Navigation Pool	10,000 cfs

c. Elevation Barge Canal Datum (USGS + 0.99 Feet)

Top of Dam	371.3
Top of Lock	368.5
Maximum Pool	
PMF	373.5
1/2 PMF	370.0
Maximum Navigation Pool	366.0
Spillway Crest	363.0
Stream Bed at Centerline of Dam	352.0+

d. Reservoir (Navigable River)

Length of Maximum Pool	N-C* FT
Length of Normal Pool	N-C FT

e. Storage (Navigable River)

Top of Dam	N.C.*
Design Surcharge	N.C.
Normal Pool	N.C.

f. Reservoir Area

Top of Dam	N.C.
Maximum Pool	N.C.
Spillway Pool	N.C.

g. Dam

Type - Concrete gravity dam comprised completely of concrete crested spillway and tainter gate; crested spillway; two side channel spillways.

Length - 553

Height - 12 feet

Freeboard between normal reservoir and top of dam - 8.5 feet

Top width - See drawings in this report

Side slopes - See drawings in this report

h. Spillway

Type - Crested spillway

Length - 553 (crest), 190 (gates)

Crest elevation - 363

Tainter gates - 6 x 26.67 = 190 feet

i. Regulating Outlets

Tainter gates described above.

*Not computed. The river channel extends with little or no slope 15 miles above the dam beyond the confluence of the Seneca and Oneida Rivers which form the Oswego River at their confluence.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in Figures 2 through 12. No information on design of the dam was available.

2.2 CONSTRUCTION

Details regarding the construction of this facility are included in Figures 2 through 12 along with previous inspection reports on the dam by New York State Department of Environmental Conservation and the New York State Department of Transportation. Modifications and major maintenance activities by the Department of Transportation are also included through 1967. The last recorded New York State Department of Conservation inspection was dated 1919. The hydropower generation facility shown on the west side of the river in Figure 5 no longer exists as can be seen in the right portion of the Overview Photograph on page iii.

2.3 OPERATION

No operation manual is known to exist for this structure.

2.4 EVALUATION

The data included in this report is adequate in order to complete this Phase I investigation. Therefore, no additional requirements for data is given at this time.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Phoenix Dam at Lock No. 1 was inspected on May 31, 1979 and again on June 13, 1979. The Dale Engineering Inspection Team was accompanied on the inspection by Richard Aldrich of the New York State Department of Transportation, Region 3, and on the second inspection by Robert McCarty of the New York State Department of Environmental Conservation Dam Safety Section. The second inspection was undertaken to further investigate the condition of the tainter gate structure.

b. Dam

At the time of the inspections, water was cresting the spillway section of the dam so that no observation could be made of the condition of the face of the concrete structure. The east abutment of the dam has been severely eroded and a portion of the spillway has been displaced from the structure. Visual observation did not disclose other physical displacement of the alignment of the structure and the facility appears to be structurally stable.

c. Appurtenant Structures

The concrete surface on the tainter gate structure is severely deteriorated. Surface spalling is prevalent throughout the structure and structural cracking is indicated in some of the supports of the tainter gates (See Photograph No. 5.). Some efforts had been made to provide maintenance of the steel tainter gates. However, much of the gates are in a rusted condition and badly in need of paint.

Lock No. 1 is in generally good condition. No evidence of leakage has been noted around the lock structure.

d. Control Outlet

Outlet from the impoundment is controlled by manipulating the tainter gates.

e. Reservoir Area

The reservoir area, which is actually the river channel, extends approximately 15 miles upstream through the Oswego, Oneida, and Seneca Rivers. There are no areas of bank instability known to exist along this course.

g. Downstream Channel

The downstream channel is reputedly formed in bedrock. No evidence of recent erosion was noted.

3.2 EVALUATION

Visual inspection reveal generally deteriorated conditions on the spillway abutments and on the concrete of the tainter gate structure. The tainter gates are badly in need of paint. No major deformation of the alignment of any of the structures was noted in the visual inspection. The tainter gates appear to be in operating condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary operational procedure is to control water levels in the impoundment upstream from the dam for navigational purposes in the Oswego Canal. Six tainter gates, 26.67 feet each, are located in the center of the dam. Access to the gates is provided from a state highway bridge located adjacent to the dam. The gates are manually operated with a rack and pinion device located next to each gate. Directives are given by the Region 3 office to the lock tender to regulate flows via the tainter gates. The total operational procedure is under control of the New York State Department of Transportation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. Once every two years a visual inspection is made of the structure by the New York State Department of Transportation inspectors and a report on the condition of the structure is filed in the Department of Transportation Central Office in Albany. Maintenance to the structure is scheduled on a priority basis as a result of the bi-annual inspections.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the flow into the downstream channel are under the control of the New York State Department of Transportation. These gates are operational to regulate flows.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals by the New York State Department of Transportation. Maintenance on the structures has been minimal in recent years as evidence by the severely deteriorated conditions of the concrete. The deteriorated condition of concrete indicates that past maintenance has not been adequate.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin located in central New York State, has a drainage area of approximately 5,100 square miles. It flows northerly discharging into Lake Ontario in the City of Oswego. The complex river system includes the seven Finger Lakes, Oneida Lake, Onondaga Lake, the Barge Canal and outlets from the lakes to the canal. The basin's major rivers, the Seneca, Oswego and Oneida, are incorporated into the Barge Canal System as are Oneida, Cayuga and Seneca Lake. All of the lakes have regulated outlets excepting Onondaga.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures, are beyond the scope of this analysis due to the fact that the dam is a run of river facility and the downstream dam break flood wave analysis is multi-dimensional. From a commentary viewpoint, the dam inspection team concludes that a partial failure under normal conditions would potentially be a navigational hazard rather than an inundation hazard.

The dam's stability and flood discharge capacity is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system. The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration runoff of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Intermediate Dam Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing the 1/2 Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience and existing data were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

An HEC-1 computer model for the basin was obtained from the New York State Department of Environmental Conservation. This model has been developed over the years through a number of study efforts by the Department with assistance from the U.S. Army Corps of Engineers, Buf-

falo District. The model was calibrated by D.E.C. to a peak flood event, Hurricane Agnes, June 20-26, 1972. The dam investigation team briefly reviewed these findings. It then obtained the flood records at the USGS gage at Lock 7 near the dam site, and within the constraints of this scope of work, verification of the existing model was obtained (See Figure C-8). The sub-basin designation, 6-hour unit hydrographs, routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted. The model was recorded for the HEC-IDB PMF analysis. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. However, these flows were accounted for by increasing the modified Puls Method rating curves for these outlets (See Appendix C). In one instance, a rating curve developed for one of these outlets and used by the inspection team on a previous inspection report was substituted into the model.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.5 inches, Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used from the D.E.C. model were in the range of 1.0 inches initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of Hurricane Agnes, June 20-26, 1972. Only one multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed, it distributed the rainfall over the 5,100 square mile area. Further in depth investigations should attempt to center the storm for critical flows since the major sub-basins lend themselves to such an analysis and a potential for greater runoff. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock No. 1 is one of six dam investigations on the Oswego River. These dams are located at Locks 1,2,3,5,6, and 7. The hydrologic analysis provides flood flows up to Lock 1 at Phoenix, New York (Lock 7 is near the mouth of the river at Oswego.). It assumes the discharges from the 6-hour time increment PMF hydrographs will be effectively the same for all the dam sites since the upstream runoff area is over 5,000 square miles and the downstream runoff area is about 100 square miles. The results of the analysis have been compared to the USGS gage discharge-frequency plot results at Lock 7 (See Figure 14).

5.3 SPILLWAY CAPACITY

The spillway is a crested spillway with tainter gates and reaches across the effective width of the river. Since the spillway is skewed, the effective crest length is 363 feet, while the tainter gates are 190 feet giving a total length of 553 feet. The side channel spillway crest shape design head was estimated from photographs of the section, at 2.80 feet (no plans are available). Subsequently, discharge coefficients were computed in the range of 3.40 to 4.10. The discharge coefficient for the tainter gates in the closed position was 3.3.

Submergence was checked and found to have a minor effect up through the PMF. A control section to check submergence was established at the old dam site, immediately below the dam. At the top of dam elevation, the overflow spillway capacity with the gates closed was computed at 32,500 cfs; with the tainter gates open was 50,000 cfs according to the D.E.C. Report. Certain plans for these six dams, some of which were constructed under a single contract, call out the original design flood as 30,000 cfs. The gage at Lock 7 has recorded 3 events greater in magnitude than the total spillway top of dam capacity. The PMF magnitude was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs.

SPILLWAY CAPACITY

	Discharge	Gates Closed Capacity as % of PMF	Gates Open Capacity as % of PMF
PMF	81,900 cfs	40%	61%
1/2 PMF	46,800 cfs	69%	106%

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam was not estimated. The river is navigable for 15 miles above the dam with a channel width of 300 to 500 feet.

5.5 FLOOD OF RECORD

Floods have been measured at USGS gaging station 04249000 at Lock 7. The gage datum is 246.0 ft.; the drainage area of the gage is 5121 sq. mi.; the period of record is from 1934 to present. The records through 1974 show that four events have had flood discharges in excess of the dam's original design flood, three were greater than existing of dam discharge capacity.

March 28, 1936	37,500 cfs
April 10, 1940	35,000 cfs
June 27, 1972	34,300 cfs (Hurricane Agnes)
April 4, 1960	31,200 cfs

An investigation conducted by the Corps of Engineers entitled Post Hurricane Agnes Investigation (June 20-26, 1972) indicates that only \$14,000 in damages occurred in the reach from Lock 1 through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped if tainter gates remain closed as follows:

OVERTOPPING IN FEET

PMF	5.0
1/2 PMF	1.5

The flood record data indicates the lock may have been overtopped if the tainter gates remained closed during high flows. The discharge capacity with the gates closed is approximately 2,500 cfs. It would be overtopped with a 1/2 PMF flood. The gates fully opened would pass the 1/2 PMF.

No significant effect due to overtopping of the dam would be realized downstream. Some damage would likely occur at the lock facility.

5.7 EVALUATION

The spillway is inadequate to pass the Probable Maximum Flood (PMF) without overtopping the dam. However, based on the Corps of Engineers' Screening Criteria, it is not considered seriously inadequate since the stability analysis indicates that the structure is stable under the 1/2 PMF event.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The major components of this dam facility consists of a tainter gate structure extending across approximately the middle half of the river, and a dam/spillway structure at both the southerly and northerly end of the gate structure. The spillway sections were being topped at the time of the field inspection and the physical condition of concrete in these structures was not fully visible for proper evaluation. Observations do indicate the spillway sections retain stability, with no indication of misalignment or displacement. However, the concrete abutment structure at the north end of the north spillway has deteriorated significantly and has had a large segment break away.

The concrete piers for the tainter gates have suffered varying degrees of deterioration, some extensive and significant, as have the gate structures. The concrete piers appear structurally stable at present, but it appears that some steel framing members for the gates could be pulled from their concrete anchoring under certain conditions of high water. Structural cracks of significance have developed in the concrete piers at some anchor plate locations, and a complete fracture is probable.

b. Geology and Seismic Stability

The Phoenix Dam, in the Oswego River drainage basin, is located within the Ontario Lowland which is part of the Central Lowland Province.

According to the 1918 Dam Report, the foundation under the spillway is rock. No notation is given for the foundation bed. The original plans included in the 1978 Inspection Report shows the dam profile along the upstream face to be sited on bedrock.

Although no rock exposures were observed in the vicinity of the dam, Gillette (1947, p. 80 and 162) reports on the rock seen by him at the dam site in 1935. He states that the bedrock is probably of uppermost Williamson Shale which is of Middle Silurian age. More recent work would now place the rock as Willowvale Shale of the same age and stratigraphically equivalent to the Williamson.

The rock seen by Gillette at Phoenix was dark-green, calcareous to slightly calcareous, platy or thinly laminated shale which contains some thin interbeds of limestone. The green shale was considered fissile. A dark, bluish-gray crumbly shale as interbeds was also present. Dip of the rock is probably less than 1° to the south,

which would be consistent with the general rock dip in this region.

Shales are usually considered as weak rocks. They may, depending upon the shale, become soft, disintegrate, and exhibit large-volume changes when wetted. No class of foundation rocks varies more widely than shales.* Some shales have strengths comparable to those of good concrete. According to Burwell and Moneymaker (1950, p. 22), "If the bedding is flat-lying and there are weak or ruptured bedding contacts, the foundations may offer little shear resistance to the horizontal forces by a dam. The problem resulting therefrom resolves itself into one of designing the structure for sliding friction or of keying the structure sufficiently far into the rock to develop the inherent shear strength of the rock itself." According to Zaruba and Mencl (1976, p. 390), "The contact between concrete and excavated shales is usually uneven, so that the shear resistance between the rock and concrete is almost invariably greater than the shear strength of shales."

The original plans are unclear as to what the south end of dam abuts. If shale, it would tend to slake easily if exposed. The fissile nature of the material would also readily allow for removal downstream and thus, conceivably, erode downstream of the dam. The type of shale present could be considered as having good bearing capacity.

There are no known faults or shear zones in the vicinity of the dam according to the New York State Geologic Map (1970). The Preliminary Brittle Structures Map of the New York State Geologic Survey (1977) indicates a possible fault zone, based on drill hole data, located about 17 miles north of the dam; this map also shows several lineaments which may possibly represent faults, the closest being about 7 miles southwest of the dam.

*Representative Properties of Shale Materials

Material Classification	Angle of Internal Friction (degrees)	Av. Shear Strength (So) (psi)	Average Unconfined Compressive Strength (Fc) (psi)	% Shear Strength to Compressive Strength (So/Fc)
Laminated silt stone	64°	1000 psi	4,210 psi	23%
Shales	28°-64°	40-570 psi	220-8920 psi	6%-22%

Ref: Underwood, L.B. & Dixon, N.A., 1976, Dams on rock foundations; Page 125-145: in Rock Engineering for foundations and slopes: Am. Soc. Civil Engineers.

The Seismic Probability Map locates the dam in a Zone 2 Designation. No earthquake activity has been recorded in the vicinity of the dam. The most severe earthquake (intensity IV on the Modified Mercalli Scale) occurred in 1954 about 23 miles southwest of the dam. The closest earthquakes occurred about 18 miles southeast of the dam in the Syracuse area. One took place in 1925 with two more in 1927, all of intensity III. Several other minor earthquakes have occurred in the region, none closer nor more recent than those referred to above.

c. Data Review and Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements comprising the dam-lock facility but do not include information on the properties of the dam and foundation materials, nor stability analysis. As part of the present study, stability evaluations have been performed for the dam/spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations but lacking assumptions felt to be practical were made. These stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. The analysis also assumed the dam section to be a monolith possessing necessary internal resistance to shear and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred the section dimensions would be less than indicated by the plans, with some adverse effect on the structural strength expected.

The results of the stability computations are summarized in the table below. The stability analysis are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	<u>Loading Condition</u>	<u>Factor of Safety*</u>		<u>Location of Resultant*** Passing through Base</u>
		<u>Overturning</u>	<u>Sliding**</u>	
(I)	Water elevations at normal operating levels, uplift on base plus 7.5 kip per lineal foot ice load acting.	1.21 ₊	12 ₊	0.25b
(II)	Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions.	1.92	17 ₊	0.48b
(III)	Water elevations at PMF levels, uplift acting on base as computed for normal operating conditions.	1.97	13 ₊	0.48b

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicate unsatisfactory stability values against overturning for the dam subject to forces possible during normal operations including ice loading according to Corps of Engineers' evaluation criteria, (e.g., where the resultant of forces acting on the dam is located outside of the middle-third of the base, tensile stresses would develop in the dam section, a condition which is structurally undesirable). The analysis indicate stability under 1/2 PMF and PMF conditions.

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the base of the dam and relative permeabilities of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner and a full tailwater hydrostatic pressure acting at the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and act upon 100 percent of the dam base. The resulting uplift force represents a condition that is, to the analysis, significant in arriving at the computed low factor of safety against overturning for the normal operations condition.

Uplift as computed for the normal operating condition was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period because of expected low foundation rock permeability.

This report's geologic review has indicated the possibility of a foundation rock susceptible to deterioration and breakdown. The physical condition of the dam sections and their foundation bearing have not been examined closely. The analysis have assumed structural integrity for the dam section and supporting foundation material. This dam facility should be inspected under a drawn down condition to fully evaluate the spillway structure, and the foundation rock downstream and beneath the dam sections. Conditions observed would serve to indicate the need for inspection of the rock upstream. If a condition of concrete deterioration or other factors which would influence the structural integrity of the dam are observed, weir stability studies based on the noted conditions should be performed.

Corrective repairs are known to be necessary for the concrete piers in the gate structure to prevent further damage to the piers and gates. Repair should include the abutment structure at the north end of the north spillway section. The results of the inspection under drawn down conditions will be used to establish the need for repair to the spillway sections and protection/improvement of the foundation rock materials.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

This Phase I inspection of the Phoenix Dam at Lock 1 did not indicate conditions which constitute an immediate hazard to human life or property. The dam's tainter gate system is severely deteriorated and could develop into a hazardous condition at some time in the near future. The dam would be overtopped 1/2 PMF flood when tainter gates are closed and will safely discharge 40 percent of the PMF. Additional structural stability analysis is warranted according to the Corps of Engineers' Criteria for stability, since the resultant force of the ice loading condition falls outside the middle third of the dam. This additional analysis should include borings to supply data determining uplift pressure. According to the Criteria, the spillway is not seriously inadequate since the structure is stable during the 1/2 PMF event.

The following specific safety assessments are based on the Phase I visual examination, analysis of hydrology and hydraulics, and structural stability:

1. A number of significant defects were observed at the tainter gate system:
 - (a) Concrete surfaces of the tainter gate structure are severely deteriorated. One pier is cracked completely through its width.
 - (b) Concrete surface spalling has occurred at most gate supports. Most anchor bolts are exposed.
 - (c) The gates are rusted and need paint.
 - (d) The concrete is eroded at the juncture or seal area of the gates and significant leakage is occurring around the gates in their normal closed position.
 - (e) The gate counterbalance concrete weights are deteriorated.
2. An eight foot portion of the top of the spillway adjacent to the eastern end wall has been displaced. A large section of concrete lies below the spillway downstream of this area.

b. Adequacy of Information

The information available is adequate for this Phase I inspection purposes. Design and construction information is limited to construction plans.

c. Urgency

The tainter gates are in a severely deteriorated condition. The supports are so deteriorated that they should probably be replaced. Investigative or replacement work should be initiated immediately, with any investigative work completed within 1 year from notification. Upon completion of investigations, design and construction should commence immediately. The remedial work should be completed with 2 years of notification.

d. Need for Additional Investigation

To prevent the development of potentially hazardous conditions, investigations as described above should be undertaken to determine structural stability of the dam.

7.2 RECOMMENDED MEASURES

The following steps should be undertaken:

1. Complete the aforementioned investigations:
 - a. Investigate structural integrity of the tainter gate system.
 - b. Perform a detailed structural stability analysis of the spillway to determine if the dam section is still competent to resist overturning forces.
2. The following remedial measures should be completed within two years:
 - a. Complete remedial work which may be required as a result of the investigations.
 - b. Repair or replace the tainter gate system.
 - c. Repair deteriorated concrete at the abutments and the spillway.

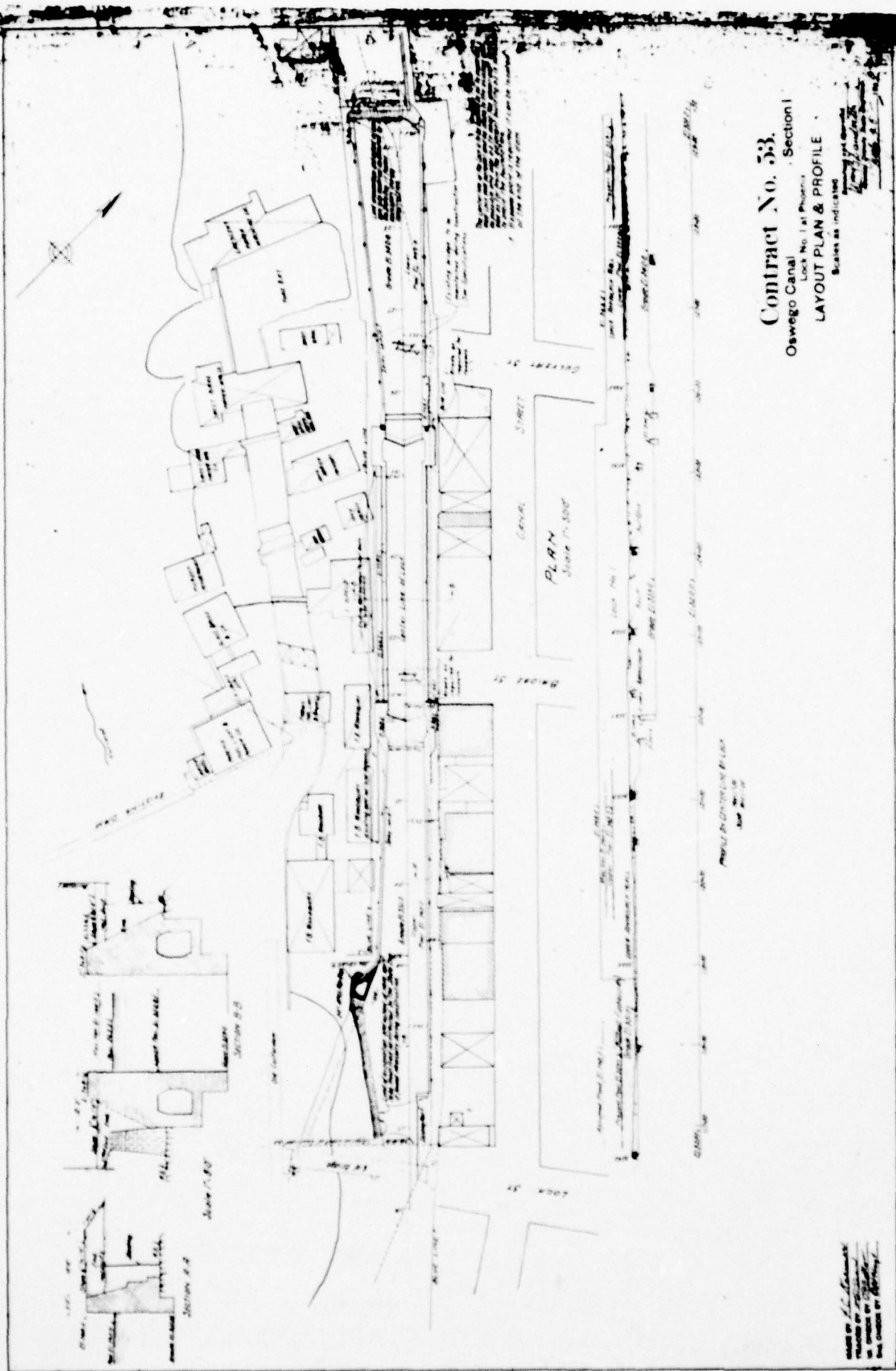
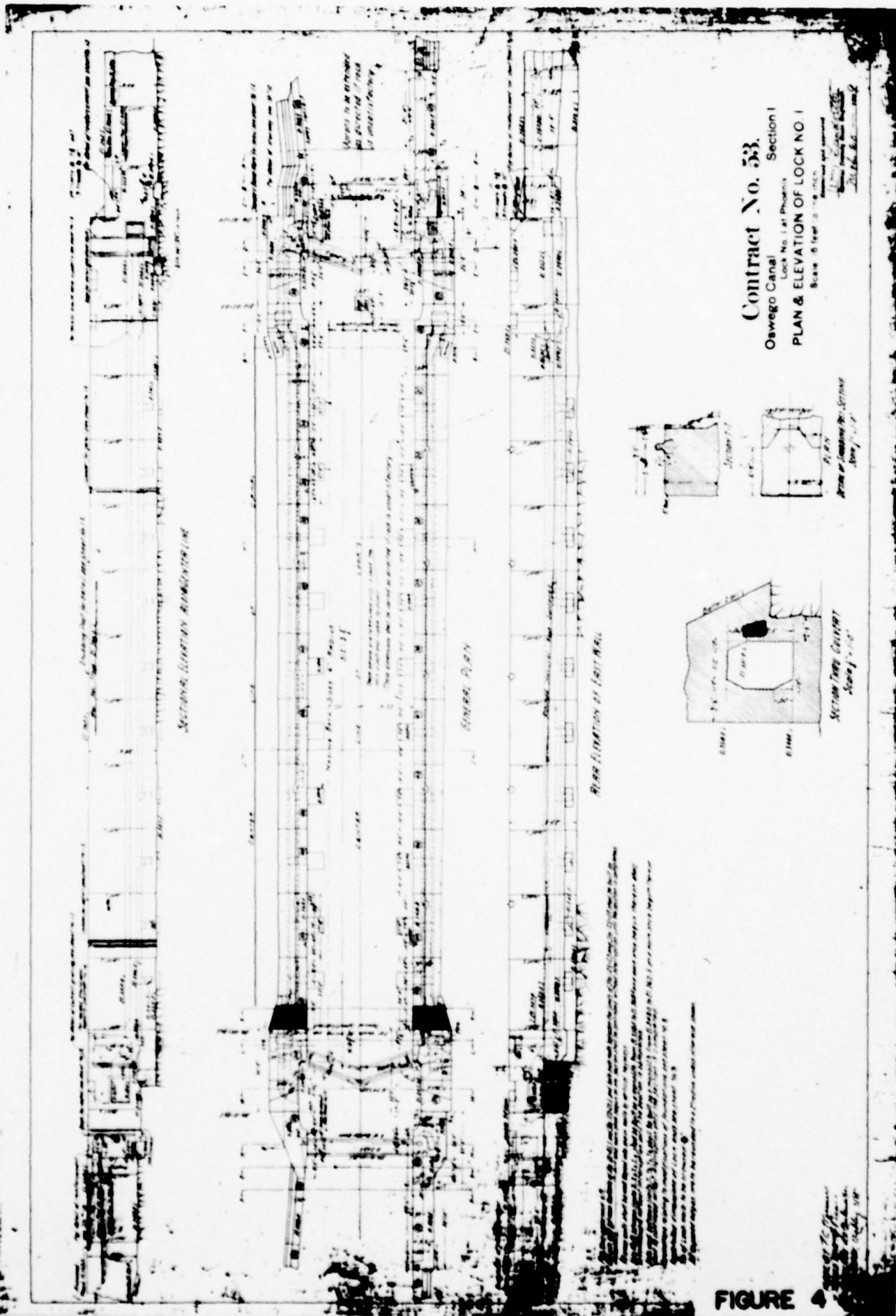
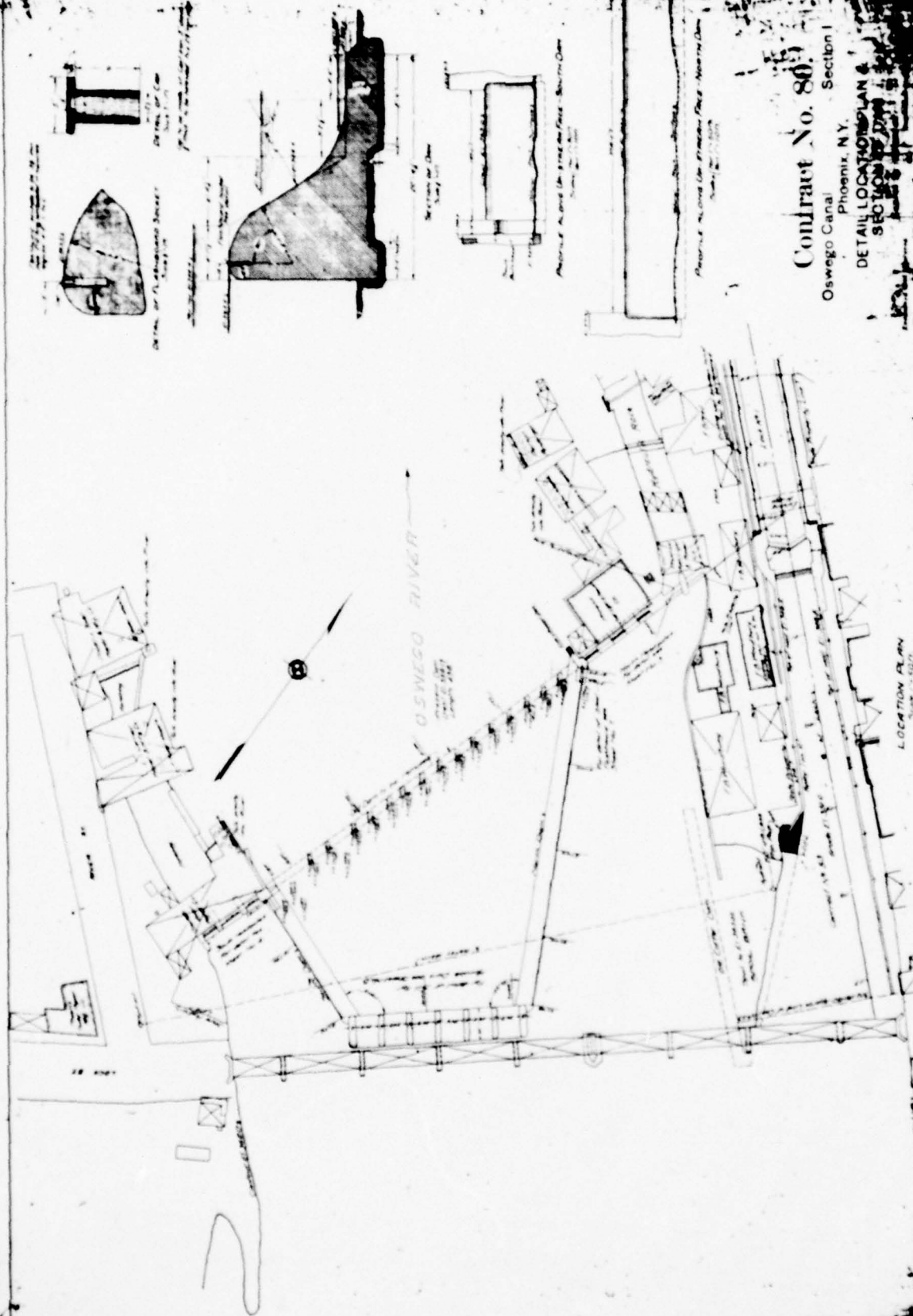


FIGURE 3





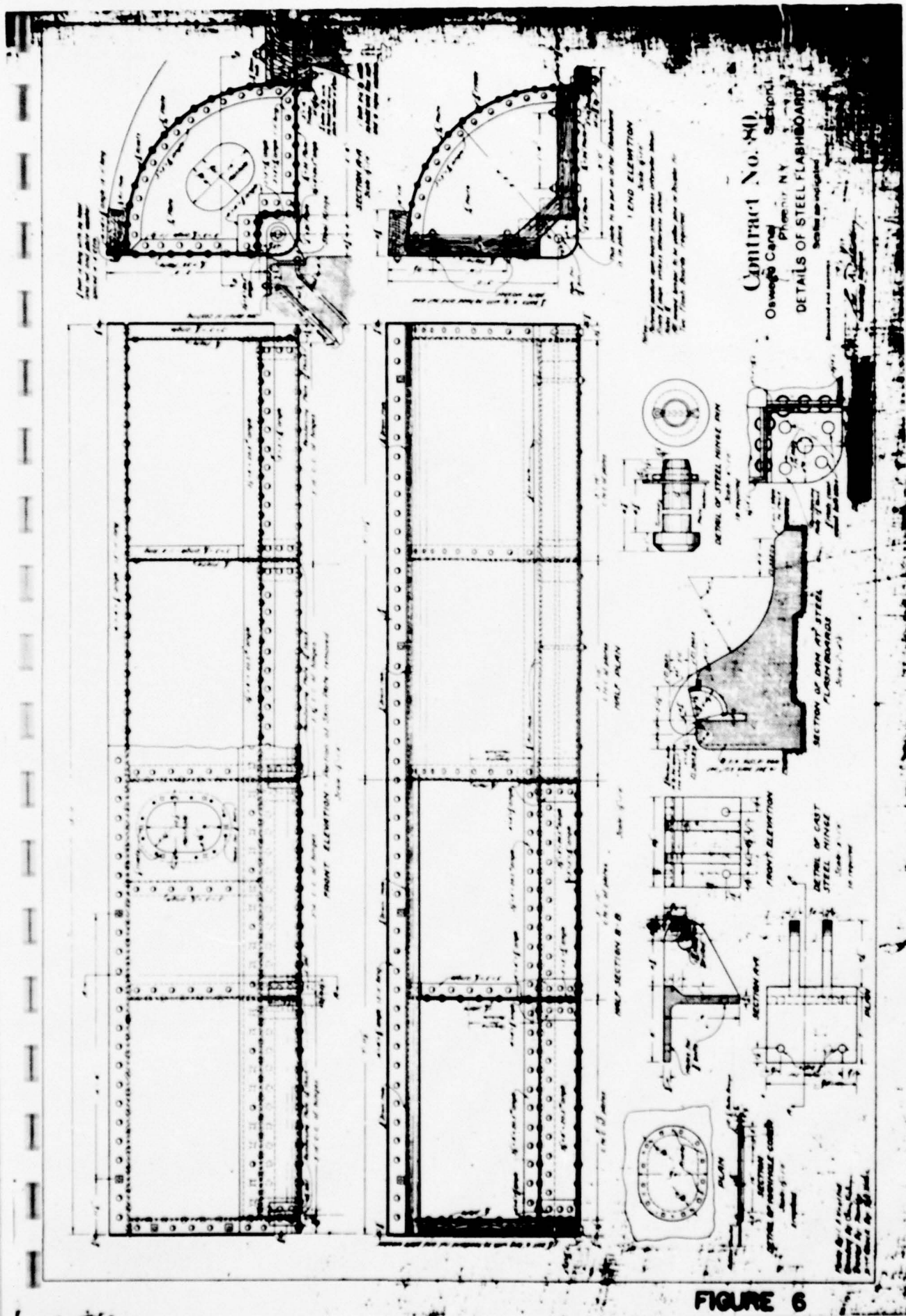
Contract No. 80.

Oswego Canal
Phoenix, N.Y.

DETAIL LOCATION PLAN &
SECTION OF DRAIN

LOCATION PLAN
Scale 1" = 500'

5102105



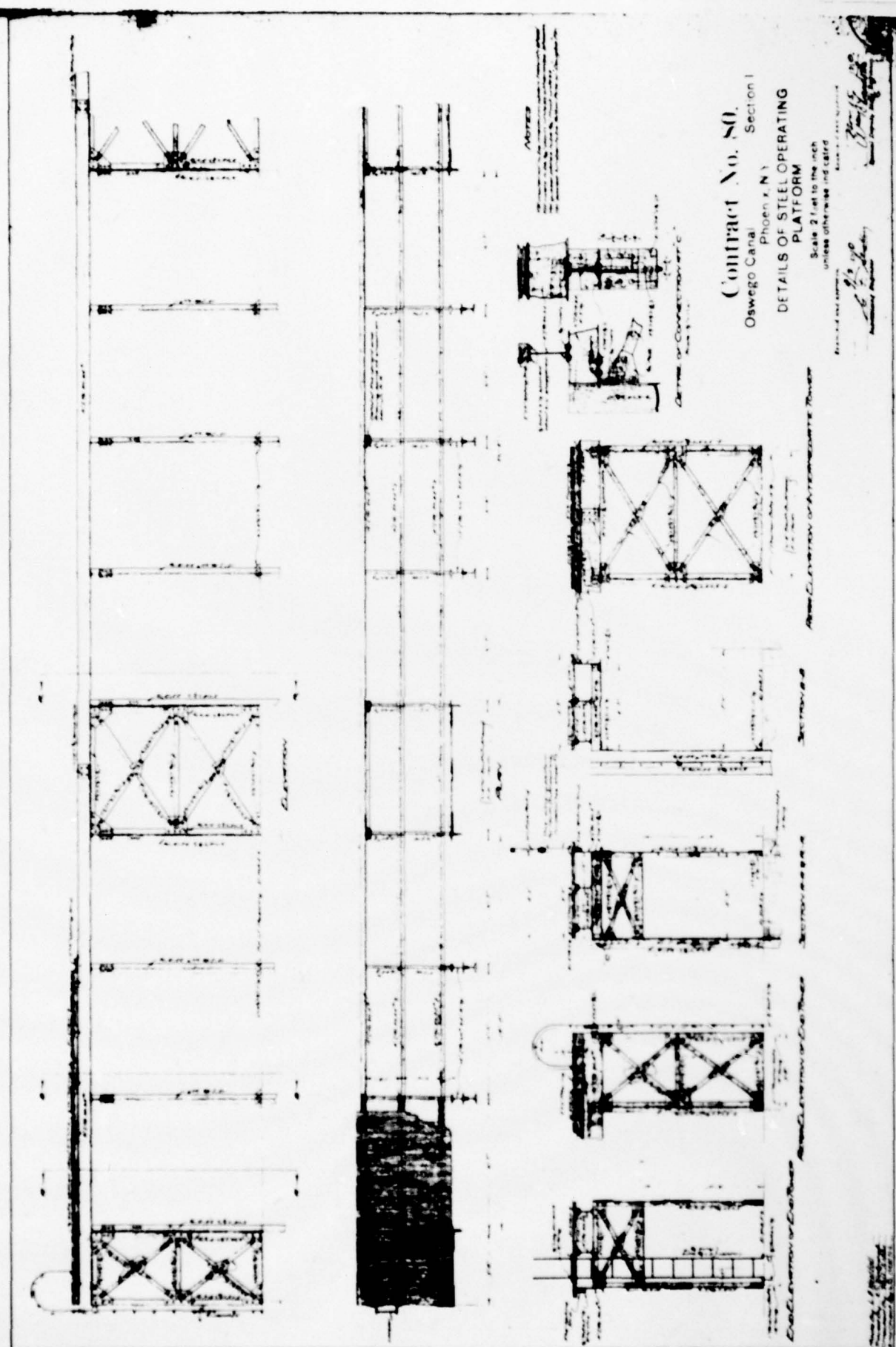


FIGURE 7

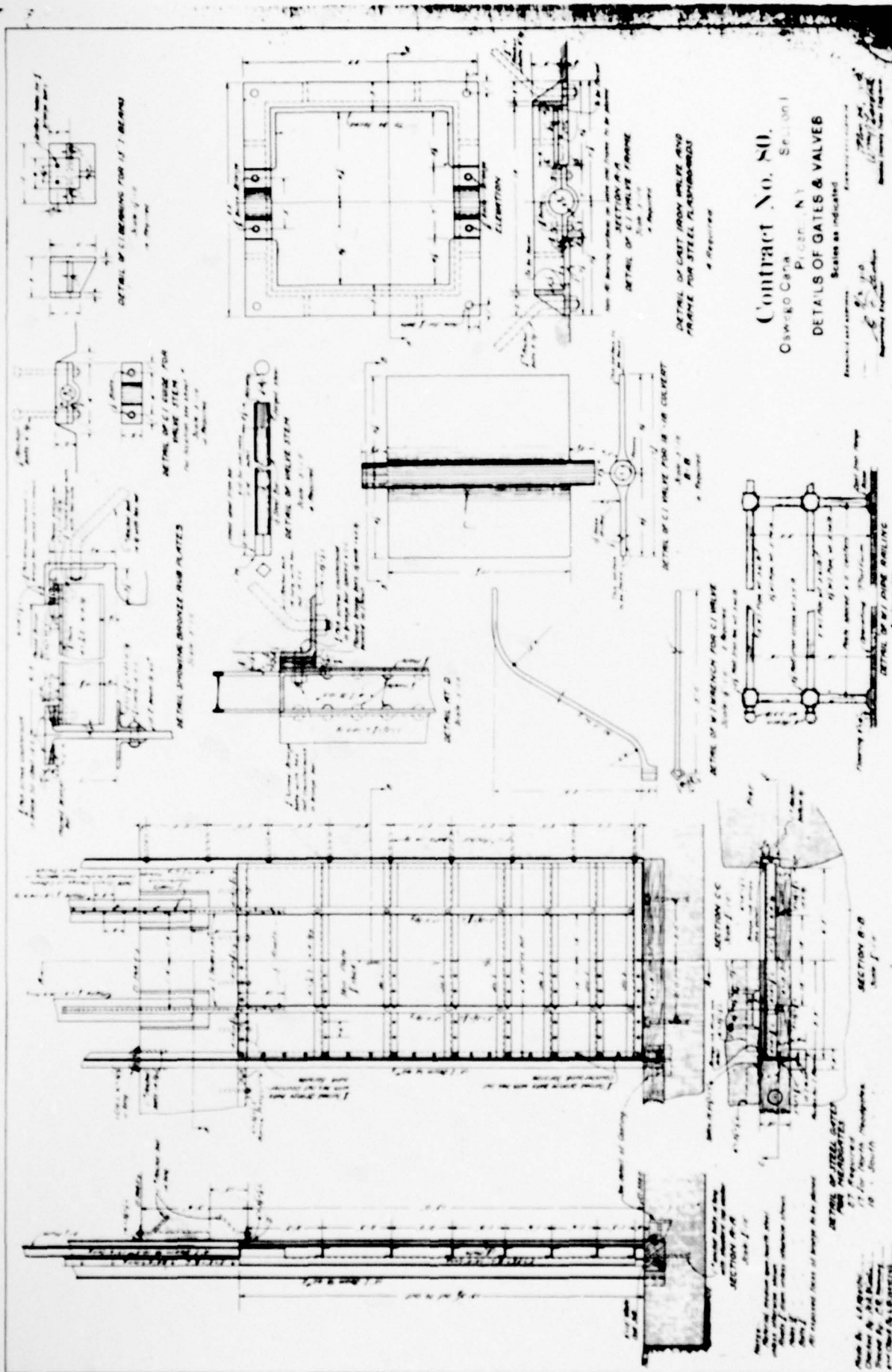


FIGURE 8

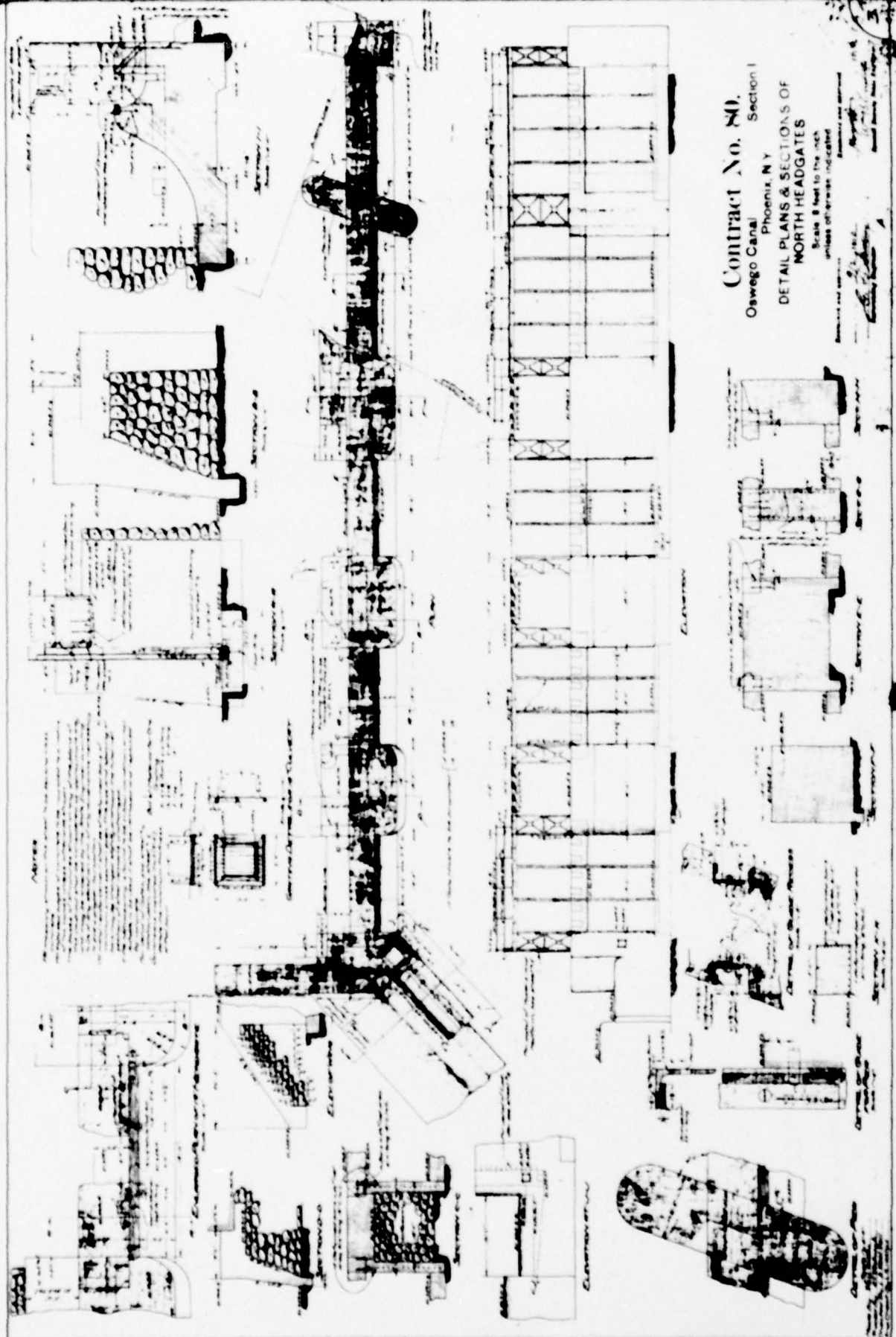


FIGURE 9

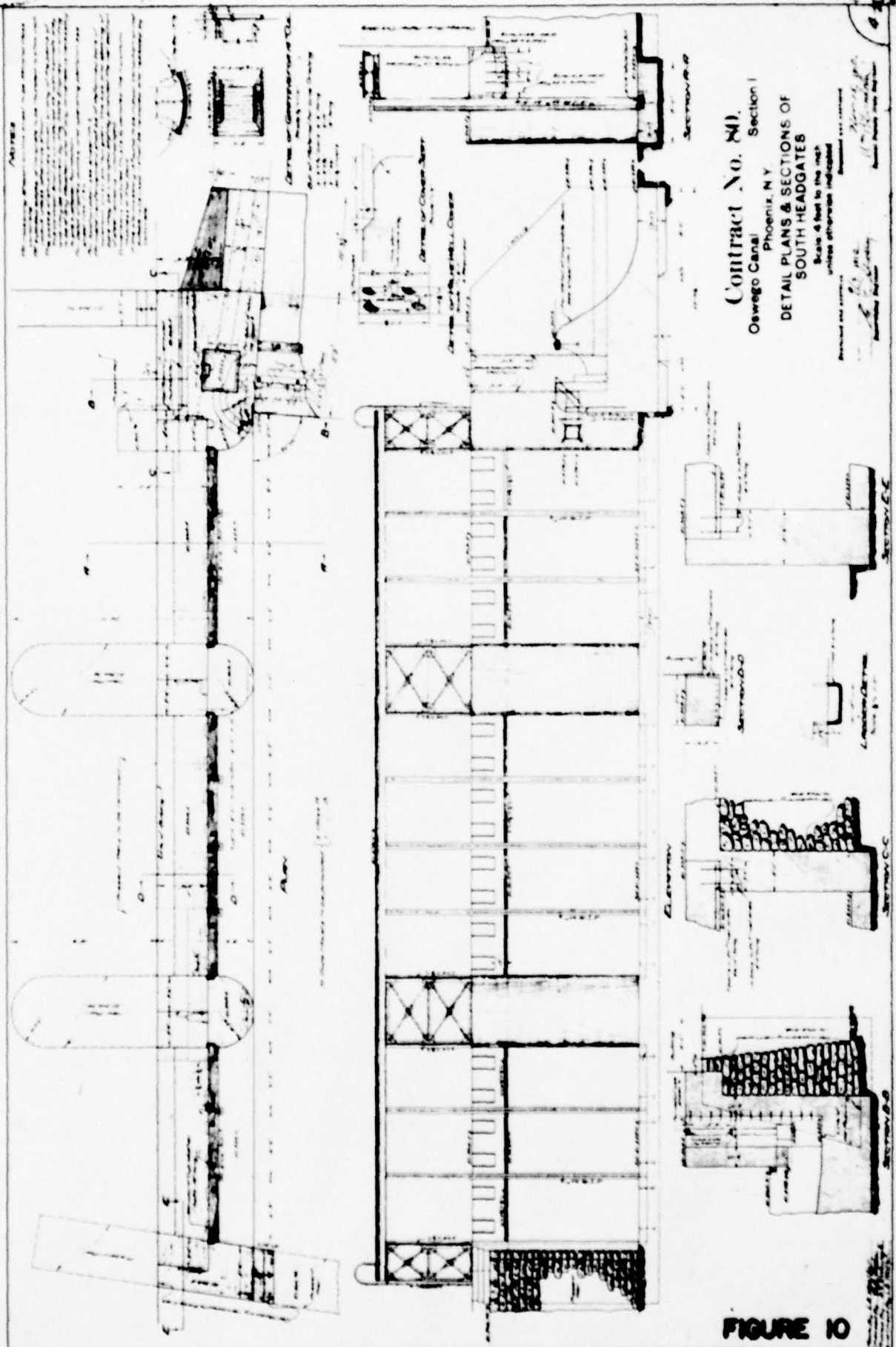
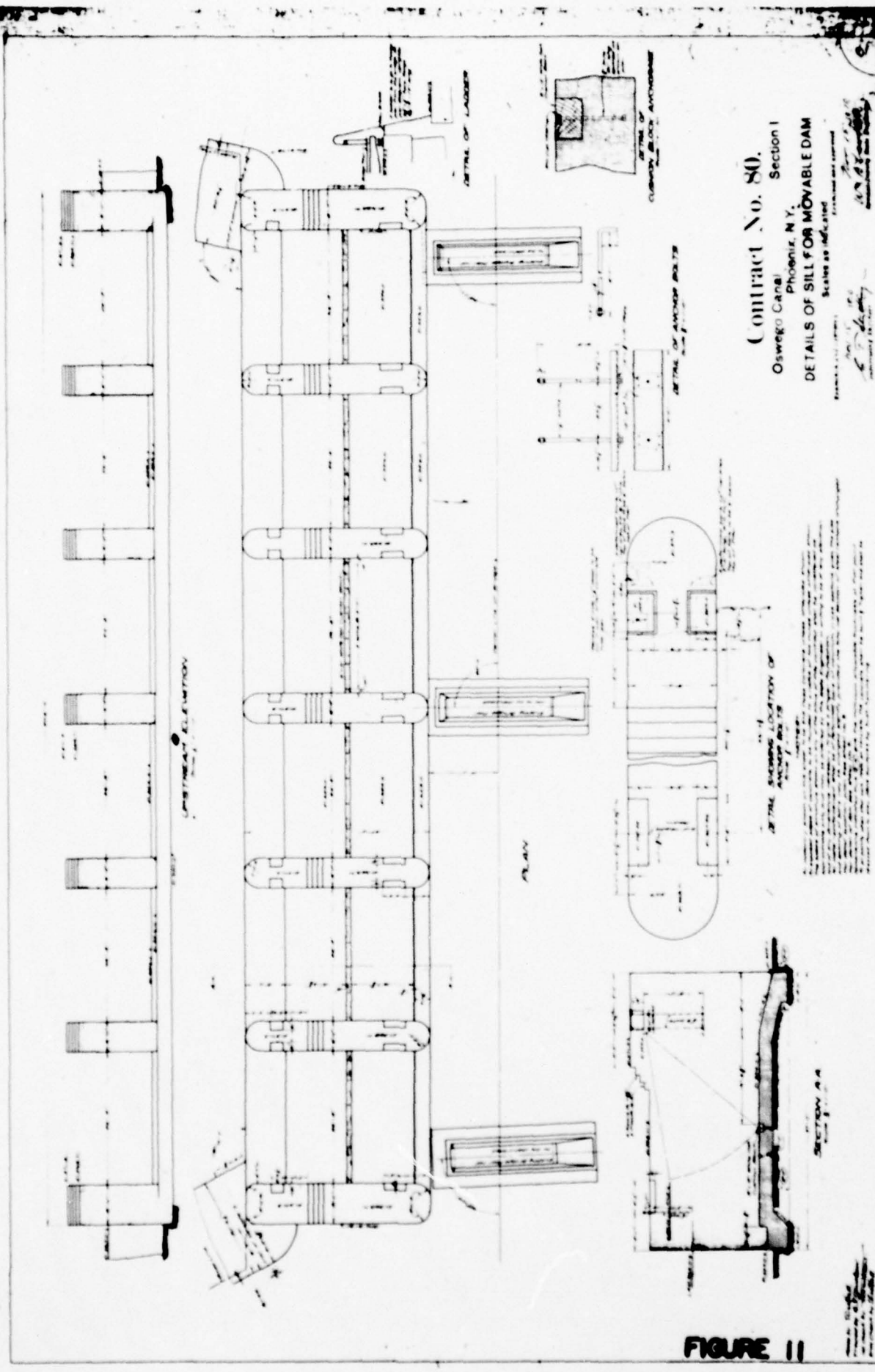


FIGURE 10



Contract No. 80.
 Oswego Canal
 Phoenix, N. Y.
 Section I
 DETAILS OF SILL FOR MOVABLE DAM
 Scale as indicated

FIGURE 11

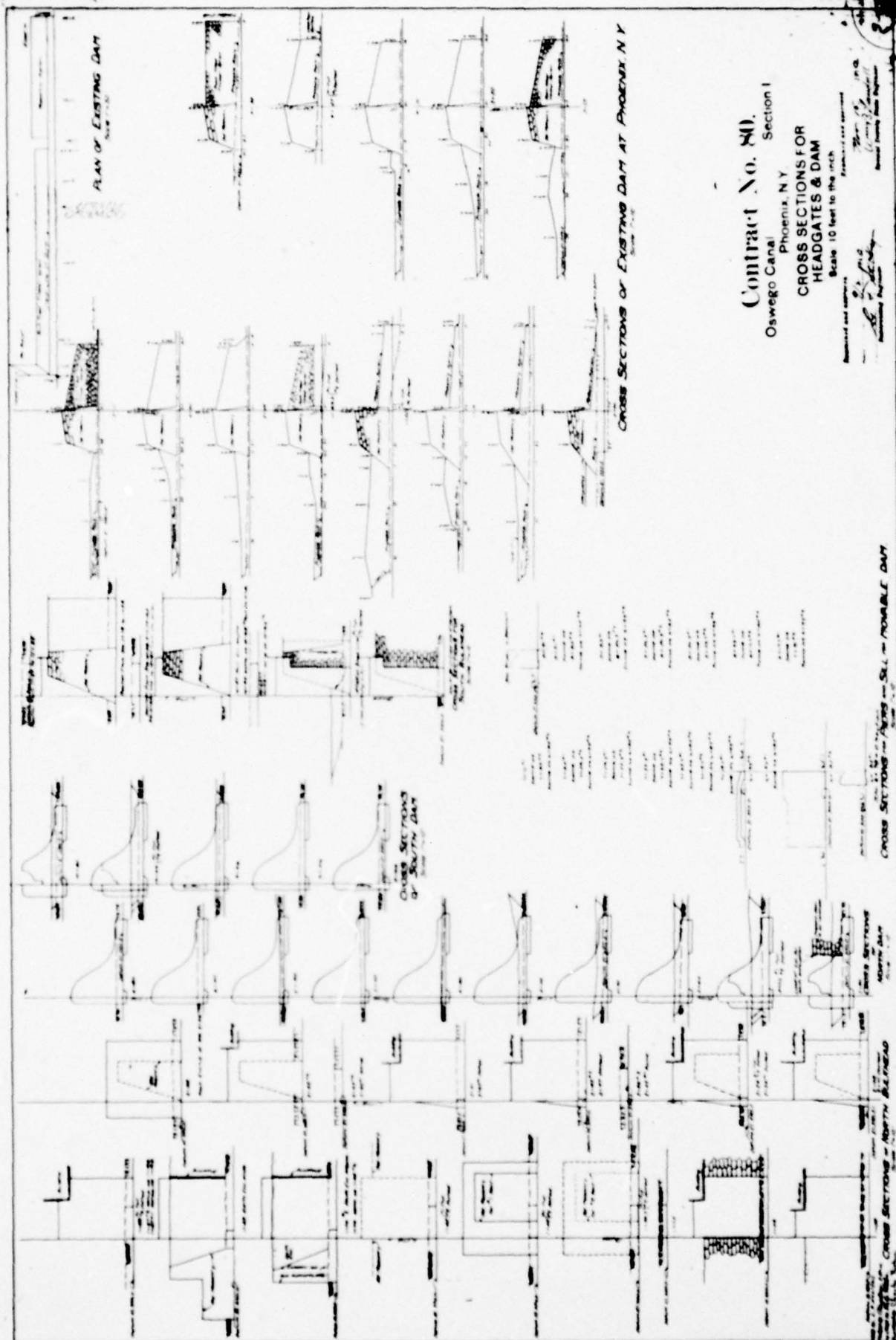


FIGURE 12

CC-RC S-100-RE at LOCK 0, PHOENIX
(FROM N.Y.S.D.E.C.)

PHOENIX

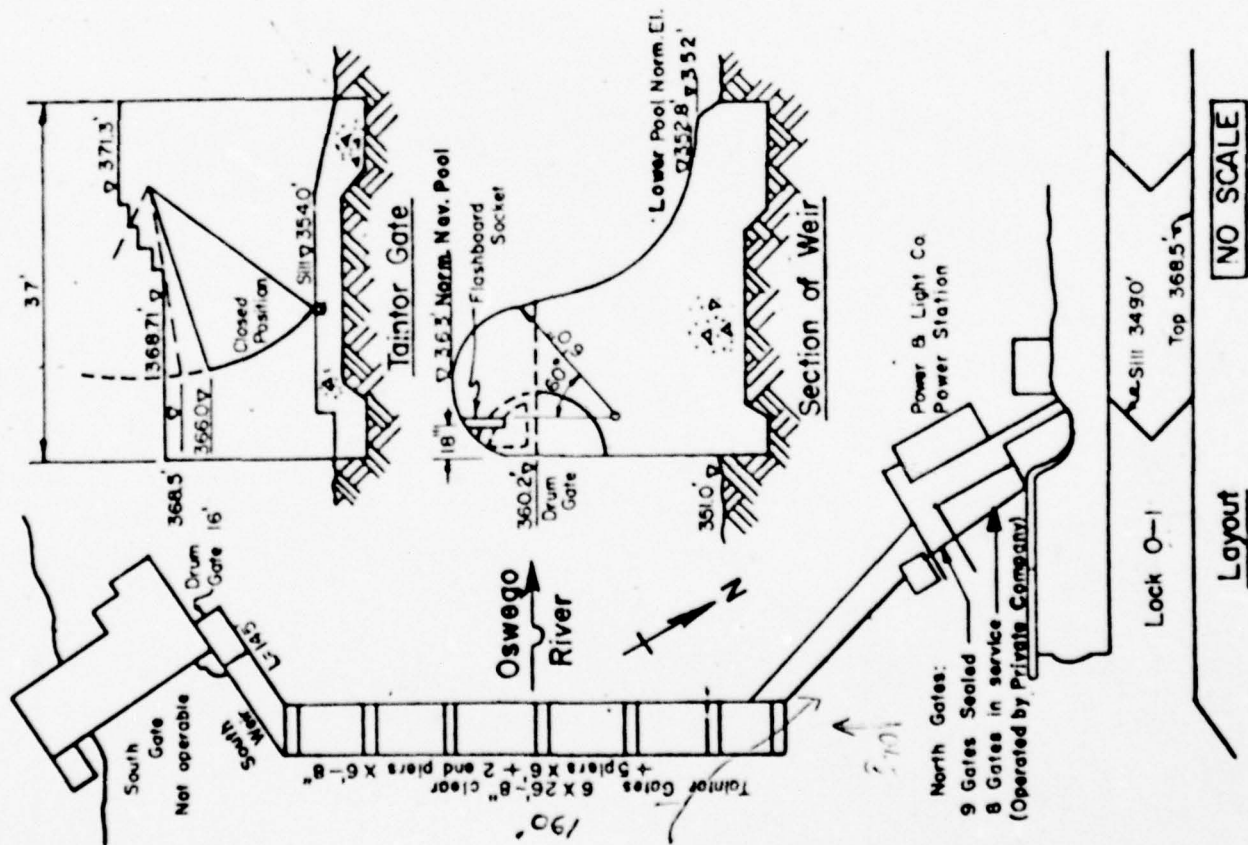
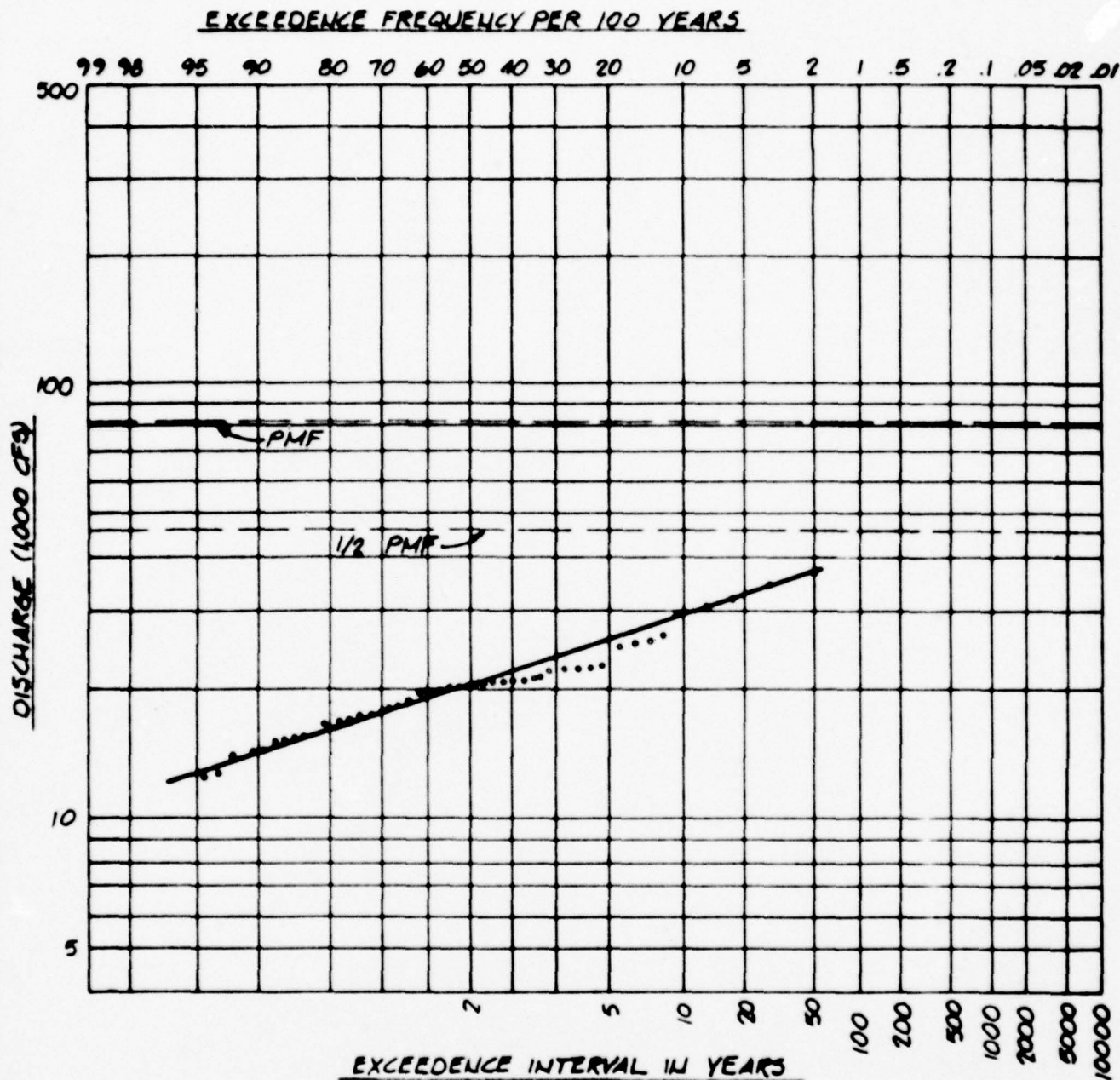


FIGURE 13



USGS GAGE
STATION 04249000
TOTAL DRAINAGE AREA = 5121 SQ MI
GAGE DATUM = 246.0 FT
PERIOD OF RECORD = 1934 - 1974

DISCHARGE - FREQUENCY
CURVE



STETSON • DALE

DATE 6.28.79

NO 2305

STATION JP6

FIGURE 14

OSWEGO
RIVER
LOCK #7

APPENDIX A
FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam	Dam at Lock 1, Phoenix	County	Oswego	State	New York	ID #	772
Type of Dam	Concrete Gravity Crested Spillway	Hazard Category		High			
Date(s) Inspection	(1) June 7, 1979 (2) June 13, 1979	Weather	Sunny	Temperature	70's		

Pool Elevation at Time of Inspection (1) 363.5* (2) --- M.S.L. Tailwater at Time of Inspection (1) 354.50* (2) ---
 *Gage readings at Lock, Barge Canal Datum. Lift: 10.2 feet
 Use of Dam Navigation

This inspection does not pertain to an independent evaluation of the condition of Lock 1.

Inspection Personnel:

(1) N.F. Dunlevy-Stetson-Dale	(1) Richard Aldrich	N.Y.S.D.O.T., Region 3 Office
(1) F.W. Byszewski-Stetson-Dale	(2) Robert McCarty	N.Y.S.D.E.C., Dam Safety Section
(1) D.F. McCarthy -Stetson-Dale		
(1) H. Muskatt - Stetson-Dale		
(2) B. Colwell - Stetson-Dale		

N. F. Dunlevy Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	None observed. Spillways overflowing at time of inspection.	No remarks.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Some deterioration at eastern end of spillway at both the spillway and wall section.	A large concrete mass is located near this area below the spillway. Further investigation should inspect this area.
DRAINS	None	
WATER PASSAGES	None	
FOUNDATION	No observation.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Spillway at eastern end has some erosion at crest.	Same recommendations as Sheet 2.
STRUCTURAL CRACKING	None observed.	No Remarks.
VERTICAL & HORIZONTAL ALIGNMENT	No movement or alignment problems observed.	No Remarks.
MONOLITH JOINTS	Spillway overflowing, however the crest shows smooth nappe flow.	No recommendations to lower pool below crest for additional inspection of joints.
CONSTRUCTION JOINTS	Spillway overflowing, however the crest shows smooth nappe flow.	No recommendations to lower pool below crest for additional inspection of joints.
STAFF GAGE OF RECORDER	Operating at lock.	No Remarks.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	N/A.	
RIPRAP FAILURES	N/A.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A.	
ANY NOTICEABLE SEEPAGE	N/A.	
STAFF GAGE AND RECORDER	N/A.	
DRAINS	N/A.	

UNGATED SPILLWAY

Crested spillway extends across the eastern half of the river and on the western side on a side channel adjacent to tainter gates.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See Comments 2 and 3	Side channel spillway on both sides river spillway also on east side of river.
APPROACH CHANNEL	River channel.	Tainter gate occupies west side of river.
DISCHARGE CHANNEL	River channel.	
BRIDGE AND PIERS	-----	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Observation conditions poor. Tainter gates leak significantly. Mostly along side panels.	No recommendation.
APPROACH CHANNEL	Upstream face of dam, west side of river.	No recommendation.
DISCHARGE CHANNEL	Downstream face of dam, west side of river.	No recommendation.
BRIDGE AND PIERS	Concrete deterioration bad at gate side seals. Spalling of concrete. Spalling at fasteners of gates.	Piers need to be repaired or replaced. Cracks completely through top of pier #2 from west bank at 45 degrees.
GATES AND OPERATION EQUIPMENT	Gates have corrosion of skinplates and members estimated at less than 10 percent. Anchors modified due to apparent poor condition of concrete piers. Counterheights concrete deteriorated.	Repairs needed to gates.

OUTLET WORKS

Outlet Works Through Tainter Gate

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	See Sheet 7	
INTAKE STRUCTURE		
OUTLET STRUCTURE		
OUTLET CHANNEL		
EMERGENCY GATE		

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Channel clear and unobstructed	No remarks
SLOPES	Channel slopes towards Upper Fulton Dam 10 miles downstream. Channel navigable.	No remarks
APPROXIMATE NO. OF HOMES AND POPULATION	The downstream reach was not visually inspected. The immediate area has the Village of Phoenix on the east bank above the dam.	Since the dam is located across a navigable waterway, heavily used for recreational travel, a high hazard rating is appropriate.
	The following are potential hazards: Lock 1, residential, commercial property, docks and boats. Loss of life potential could be more than 4 people from either a flood flow or normal operating situation dam breach. A substantially higher loss of life potential is not foreseeable.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER	None observed.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Overbank area above pool area relatively flat.	No remarks.
SEDIMENTATION	No sedimentation build-up observed.	No remarks.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Lock 1 Dam at Phoenix

ID #

ITEM	REMARKS
AS-BUILT DRAWINGS	See this report.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	No data.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	Not obtained for this inspection.

ITEM	REMARKS
DESIGN REPORTS	No data.
GEOLOGY REPORTS	No data.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No data.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	No data.
POST-CONSTRUCTION SURVEYS OF DAM	No data.
BORROW SOURCES	N/A.

ITEM	REMARKS
MONITORING SYSTEMS	Information available at lock.
MODIFICATIONS	None.
HIGH POOL RECORDS	No data.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	No data. Limited to information on previous inspection reports, see this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	No data.
MAINTENANCE OPERATION RECORDS	Same comment as above for monitoring system.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report.
OPERATING EQUIPMENT PLANS & DETAILS	See this report. More information available from N.Y.S.D.O.T. See card file on maintenance and improvements in this report.

CHECK LIST HYDROLOGIC & HYDRAULIC ENGINEERING DATA

Elevations: Barge Canal Datum (USGS + 0.99 feet)

DRAINAGE AREA CHARACTERISTICS: 4950 (+) square miles.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 363.0

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ---

ELEVATION MAXIMUM DESIGN POOL: ---

ELEVATION TOP DAM: 371.5

CREST:

a.	Elevation	363
b.	Type	Crested spillway - see report
c.	Width	Crested spillway - see report
d.	Length	533
e.	Location Spillover	East and West side river
f.	Number and Type of Gates	6 @ 20.67 Tainter
		190 feet

OUTLET WORKS:

a. Type Tainter gates described in (f.) above.
b. Location _____
c. Entrance Inverts _____
d. Exit Inverts _____
e. Emergency Draindown Facilities _____ 32,000 cfs at
spillway crest.

HYDROMETEOROLOGICAL GATES:

a. Type _____ ---
b. Location _____ ---
c. Records _____ ---

MAXIMUM NON-DAMAGING DISCHARGE: ---

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

000000

LOCK NO. 1

PHOENIX

STA. 121

Equip.

Con. 53
" 97A - 90
" U.S. 93

Lower Pool 352.80

Upper Pool 353.00

Upper Mitre Sill 348.5

Lower Mitre Sill 339.5

x 7 Valves

NOTE: Village Waterline under Lock is at Sta. 121+80.5 (from Cont. 53 notes).

1927 - Painted complete.

1929 - Anchors for gate A frames installed. Started building boathouse.

1931 - Boathouse painted.

N.W. cor. of Lk. wall chipped & new 8" slab placed - new recesses to extend gate anchor rods. N.E. cor. of Lk. wall chipped & new anchor rod recesses & cable trench built in conc. Lock signal light system installed.

1932 - Cut away top & face of W. Lk. chamber wall from Br. 03 north to end of Lk. & placed new top and face slabs.

Extended gate anchor rods on N.E. cor. Built seven piers in river just So. of Br. 02

1933 - Pulled lower left valve and placed new side seal strip.

1943 - Overhead type Buffer Beam placed upper end.

1944 - Overhead type Buffer Beam placed lower end.

1944-5 - Lock completely overhauled

1947 - Gate & Valve motors overhauled.

1948 - Left gate machinery reanchored, new cable for signal lights, interior shop build remodeled.

1953 - Gate & valve motors overhauled, new rub sticks at lower end, new Kentile floor.

1954-5 - Unwatered - overhauled, replaced sills with angle iron, replaced valves, 2 & seating rails. Installed recesses for guard gate at upper end. Guard gate tower reinforced, counterweight basket reinforced, tower and up and low gates scraped and painted. Replaced rub sticks. Replaced 8" oak seal on gates. Installed sealing strip for bottom of gate. New door for workshop.

1956 - 246 ft. of upper approach wall repaired.

1957 - Oil furnaces installed lockhouse & powerhouse. Rub sticks replaced. Limit switch panels replaced.

1958-9 - Contract U.S. 93, sills lowered & gates extended. Valves overhauled by state forces. New lockhouse, lockers & benches. Old lockhouse removed. New bumper blocks, new storm windows. Lower W. wall repairs. Removed old conc. & placed blacktop on W. Lock wall. New storm windows. New control stand house.

1962 - Lower gate & valve motors overhauled, limit switches overhauled, crossing gate motors repaired, gate machinery rebuilt, old building removed.

1963 - Addition to lockhouse constructed, motor generator installed, old powerhouse razed, lock rewired, four valves replaced also chains, cupwheels & shafts Upper gates & anchor arms repaired, timbers refitted, new type half-quoins and miters, rubber seal strips, installed 4 rebuilt valves, refaced with conc. 250' along E. chamber wall, repaired lower E. approach wall.

1965 - 250' of conc. repaired on E. chamber wall, 350' of E. lock wall blacktopped, motors repaired, buildings & cabinets painted.

1967 - Repaired bullgear for lower left gate.

LOCK NO. 1

PHOENIX (cont.)

STA 121

1969-70 0-1 Replaced light gate machinery with reconditioned heavy machinery salvaged from Lock 0-8; winter repairs 1969-70 - install rebuilt valves fitted for cable operation, renew rails, wheels & counterweights, repair and paint gates, patch concrete; new wood seals & miters.

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE TO NO SEC/WEST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HEIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATION
WS F0F1 701 2A	F						BRIDGE ACROSS LIMESTONE FEEDER
WS F0F5 701 2A	F						FARM BRIDGE OVER LIMESTONE CREEK
WS 0002 701 2B	O	116+50				103	LOCK ST BR PHOENIX
WS 0003 701 2B	C	122+65				05	BRIDGE ST BR PHOENIX
WS 0004 701 2B	O	126+30	352.8			167	CULVERT ST BR PHOENIX
WS 0007 701 2B	O	613+65				117	SWING BR AT LOCK 02
WS 0001 701 2C	E						BRIDGE OVER OLD CAUGHDENY LOCK
WS F0F1 701 2C	F						ANDREWS ROAD BRIDGE
WS F0F2 701 2C	F						FARM RR. S. OF ANDREWS RD., BUTTERNUT FEEDER
WS F0D1 701 2C	F						TWIN PIPE CULV S. LAKE RD - DERUYTER
WS F0D2 701 2C	F						BOX CULV. E. LAKE ROAD DERUYTER
WS F0D3 701 2C	F						FARM BRIDGE - DERUYTER INLET
WS F0D4 701 2C	F						FARM BRIDGE - DERUYTER INLET
WS F0D5 701 2C	F						BRIDGE OVER DERUYTER OVERFLOW
WS 0024 701 3A	E	3932+00	374.0	13.2		45	RALOWINSVILLE DAM
WS F0B1 701 3A	F			5.0			BUTTERNUT CREEK DIVERSION DAM
WS F0D1 701 3A	F		1288.0	70.0			DERUYTER DAM
WS F0D2 701 3A	F						DERUYTER INLET DIVERSION DAM
WS F0F1 701 3A	F		430.0	6.5			LIMESTONE CREEK DIVERSION DAM
WS F0J1 701 3A	F		645.5				JAMESVILLE DAM
WS 0001 701 3A	O	117+00	343.0	11.0	6	40	PHOENIX DAM <i>Total Dam</i>
WS 0002 701 3A	O	608+60				10	UPPER DAM FULTON "
WS 0003 701 3A	O	641+00	335.0	17.0		10	LOWER DAM - FULTON <i>Key J</i>
WS 0005 701 3A	O	971+00	308.0	19.5		37	DAM 5 AT MINETTO
WS 0006 701 3A	O	1146+25	290.0	33.0		37	DAM 6 - HIGH DAM AT LOCK 04 - NSDEGU

NEW YORK STATE GENERAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HEIGHT	TUNNEL SZ/ NO GATES	HISTORICAL NAME AND LOCATION ORIG CONTRACT
45 0007 701 3A	0	1166+00	270.0	12.0	35	CURVED DAM AT LOCK 07 - OSWEGO
45 0001 701 3A	X					CARPENTER BROOK DIVERSION DAM (NOT NEEDED)
45 0002 701 3A	Y	5090+00	375.4		5	OWASCO CREEK ENTRANCE 550FT LEFT
45 0023 701 3C	E		369.9	8.0	493	CAUGHNEMOY DAM
45 0124 701 3D	E	3931+50			635	TAINTOR GATE CONT M63+5
45 0002 701 3D	F				1	WASTE GATE - BUTTERNUT AQUEDUCT
45 0001 701 3D	F				2	BUTTERNUT FEEDER BULKHEAD
45 0004 701 3D	F				4	DERUYTER INLET HEADGATES
45 0003 701 3D	F			5.0		STREAM ENT. - DERUYTER INLET
45 0001 701 3D	F		1280.0	3.0		DERUYTER DAM SPILLWAY
45 0002 701 3D	F				3	DERUYTER DAM OUTLET GATES
45 0001 701 3D	F				4	LIMESTONE FEEDER BULKHEAD
45 0001 701 3D	F				1	WASTE GATE - LIMESTONE AQUEDUCT
45 0001 701 3D	F					JAMESVILLE DAM SPILLWAY
45 0002 701 3D	F				3	JAMESVILLE DAM OUTLET GATES
45 0001 701 3D	0		363.0	12.0	6	TAINTOR GATES <i>Key E, Moravia Crest</i>
45 0001 701 3D	0		363.0		80	NORTH AUTO FLASHBOARD BLOCKED TOP <i>Key D</i>
45 0001 701 3D	0		363.0		80	SOUTH AUTO FLASHBOARD BLOCKED TOP <i>Key F</i>
45 0001 701 3D	0		363.0	11.8	80	NORTH SPILLWAY <i>Key D</i>
45 0001 701 3D	0		363.0	11.0	80	SOUTH SPILLWAY <i>Key F</i>
45 0002 701 3D	0		352.8	10.3	10A	SPILLWAYS <i>Key H</i>
45 0002 701 3D	0				6	TAINTOR GATES <i>Key I</i>
45 0001 701 3D	0	661+00	311.0		205	SPILLWAY IN DIKE BELOW LOCK 03
45 0005 701 3D	0	1180+75			35	RY-PASS CULVERT ABOVE LK OF 2 GATES
45 0007 701 3D	0	1184+80			709	FEED GATE - LOCK 07

13

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LWM/ONLY)	LIFT/ MIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATION
WS 0002 701 30	0	1191+00	255.8			W64	SIDE SPILLWAY BETWEEN LOCKS 07 & 08
WS 0003 701 30	0	1203+71	255.8			W64	SIDE SPILLWAY WEST WALL ABOVE LOCK 8
WS 1001 701 30	1	60+15				720	ONONDAGA CREEK SPILLWAY
WS 0224 701 3E	E	3931+90				200	TAINTON GATE NW POWER RACE 530 FT L
WS 0001 701 3E	F						OVERFLOW FLUME - DERUYTER DAM
WS 0002 701 3E	F						DERUYTER OUTLET FLUME
WS 0051 701 3E	0	110+00		3		80	SOUTH HEADGATE NO 1 PLUGGED <i>Key G</i>
WS 0061 701 3E	0	119+10		4		80	SOUTH HEADGATE NO 2 PLUGGED " "
WS 0071 701 3E	0	119+40		3		80	SOUTH HEADGATE NO 3 PLUGGED " "
WS 0011 701 3E	0	121+00	352.0	13.3		80	NORTH HEADGATE NO 1 <i>Passway SILL</i>
WS 0021 701 3E	0	121+56		3		80	NORTH HEADGATE NO 2 PLUGGED <i>Key C</i>
WS 0031 701 3E	0	121+42		3		80	NORTH HEADGATE NO 3 PLUGGED " "
WS 0041 701 3E	0	121+28		3		80	NORTH HEADGATE NO 4 PLUGGED " "
WS 0053 701 3E	0	640+00				100	POWER FOREBAY - LOCK 03 - FULTON <i>Key D</i>
WS 0063 701 3E	0	640+35		2		100	BULKHEAD NO 4 & SIDE LOWER DAM <i>Key M</i>
WS 0033 701 3E	0	640+50		.10		100	BULKHEAD NO 3 & SIDE LOWER DAM " "
WS 0023 701 3E	0	642+20		3		100	BULKHEAD NO 2 & SIDE LOWER DAM <i>Key H</i>
WS 0063 701 3E	0	652+00				10	POWER TAILRACE BELOW LOCK 03 <i>Key P</i>
WS 0005 701 3E	0	972+15				37	BULKHEAD NO 5 - MINETTO
WS 0052 701 3E	0			17		10	BULKHEAD NO 5 (UPPER DAM) <i>Key G</i>
WS 0006 701 3E	0	1145+90		24		37	BULKHEAD NO 6 - HIGH DAM - OSWEGO
WS 0077 701 3E	0	1169+06		24			BULKHEAD NO 7 - CURVED DAM - OSWEGO
WS 0017 701 3E	0	1185+00				35	HYDRAULIC CANAL BULKHEAD (SEALED)
WS 0001 701 4A	E		369.0			720	CLEVELAND TERMINAL
WS 0002 701 4A	E						DICK-FRENCHMAN'S IS

JUSTICE CATES SPILLWAYS WASTE WEIRS - 1977

[illegible][illegible]

Don't tell me that's not a good idea!

S-72 - 200

Form W-31, 5-12-16-3000 (16-16734)

Ans. 200

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK
CONSERVATION COMMISSION
ALBANY

DAM REPORT

August 6, 1918
(Date)

CONSERVATION COMMISSION,

DIVISION OF WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Phoenix Dam.

This dam is situated upon the Pomoy River
(Give name of stream)
in the Town of Lyonsville, Quonabate County,
about in from the Village or City of Phoenix
(State distance)
The distance — stream from the dam, to the Pomoy River Ferry
(Up or down) (Give name of nearest important stream or of a bridge)
is about 0 miles
(State distance)

The dam is now owned by State of N. Y.
(Give name and address in full)
and was built in or about the year —, and was extensively repaired or reconstructed during the year —.

As it now stands, the spillway portion of this dam is built of granite & masonry
(State whether of masonry, concrete or timber)
and the other portions are built of —
(State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is rock and under the remaining portions such foundation bed is —.

The total length of this dam isfeet. The spillway or waste-weir portion, is aboutfeet long, and the crest of the spillway is aboutfeet below the abutment.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows:

At the time of this inspection the water level above the dam wasft. ⁶ in.
above
below the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks or erosions which you may have observed.)

*The dam is in fine condition
U.S. Troops. did not want me to take measurements*

Reported by *Roger Johnson*
(Signature)

Bushville

(Address—Street and number, P. O. Box or R. F. D. route)

N. Y.

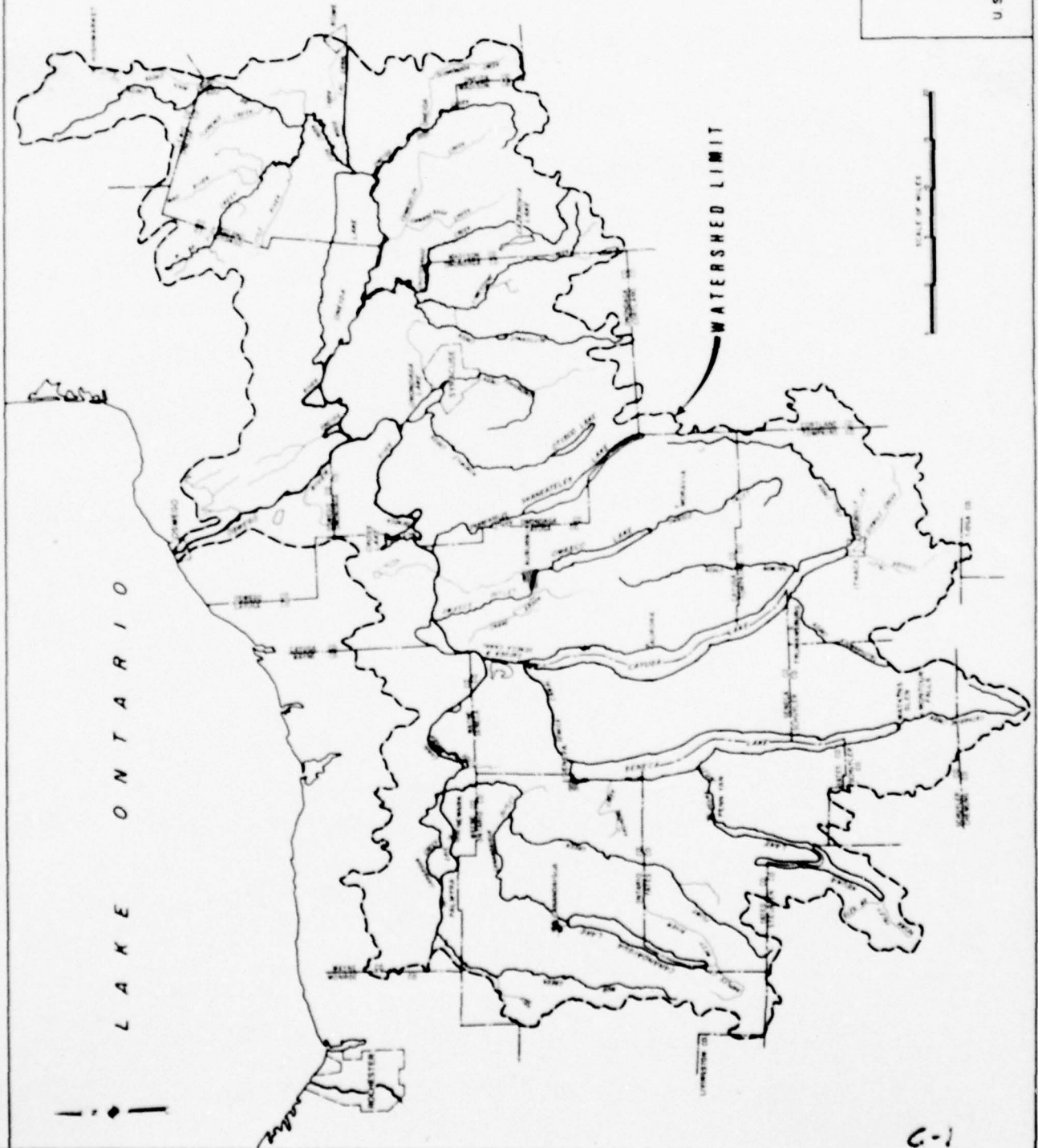
(Name of place)

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGY

Figure C-1	Watershed - Oswego River Basin
Figure C-2	Principal Drainage System
Figure C-3	Facilities (Water Management)
Figure C-4	Storm Pattern June 20-25, 1972
Figure C-5	HEC-1 Derived Discharge-Frequency Curve By N.Y.S.D.E.C.
Figure C-6	Basin Model (HEC-1) Sub-Basins and Sub-Areas
Figure C-7	Basin Model (HEC-1) Flood Routing System
Figure C-8	Calibrated HEC-1 Results (June 20-25, 1972)
Table I-1	Physical Characteristics of Lakes in the Basin



COUNTIES

- 1 CAYUGA
- 2 CHEMUNG
- 3 CORTLAND
- 4 LEWISTON
- 5 LYNDEN
- 6 MADISON
- 7 MONROE
- 8 ONEIDA
- 9 ONTARIO
- 10 OSWEGO
- 11 SCHUYLER
- 12 SENECA
- 13 STEUBEN
- 14 TIOGA
- 15 TOMPKINS
- 16 WAYNE
- 17 YATES

LEGEND

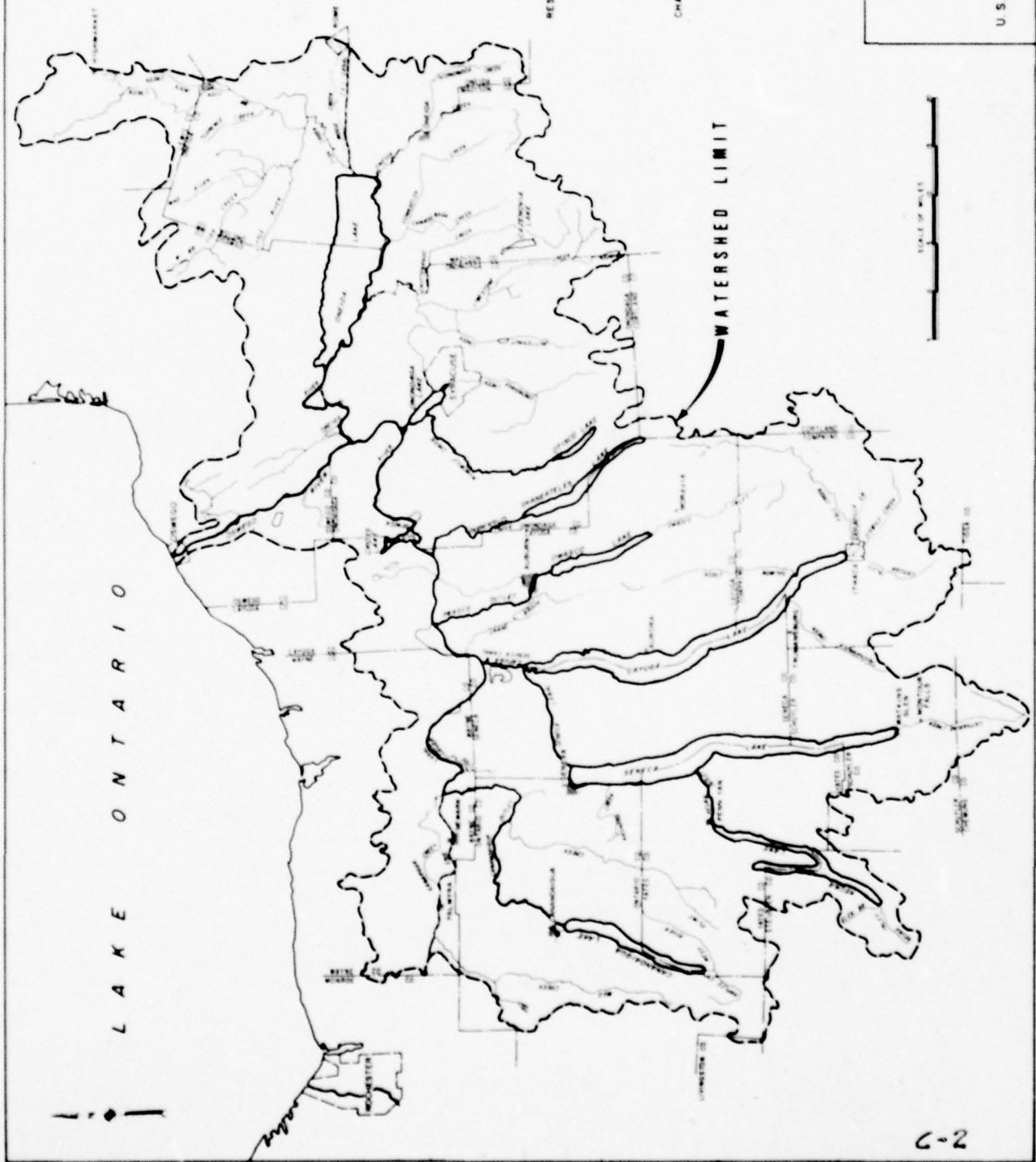
- COUNTY BOUNDARY
- MUNICIPAL BOUNDARY
- URBAN PLACE

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

WATERSHED

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

SCALE OF MILES



PRINCIPAL DRAINAGE SYSTEM

RESERVOIRS CANADAGUA

KEPUA

SENECA

CATARAUGUS

OSWEGO

SWANETTES

OTISCO

ONONDAGA

ONEIDA

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

OSWEGO

FINGER LAKES
RESERVOIRS

CHANNELS

CANADAGUA OUTLET

KEPUA OUTLET

SENECA RIVER & ASSOC CANALS

OSWEGO OUTLET

SWANETTES CREEK

WINDMILL CREEK

ONONDAGA OUTLET

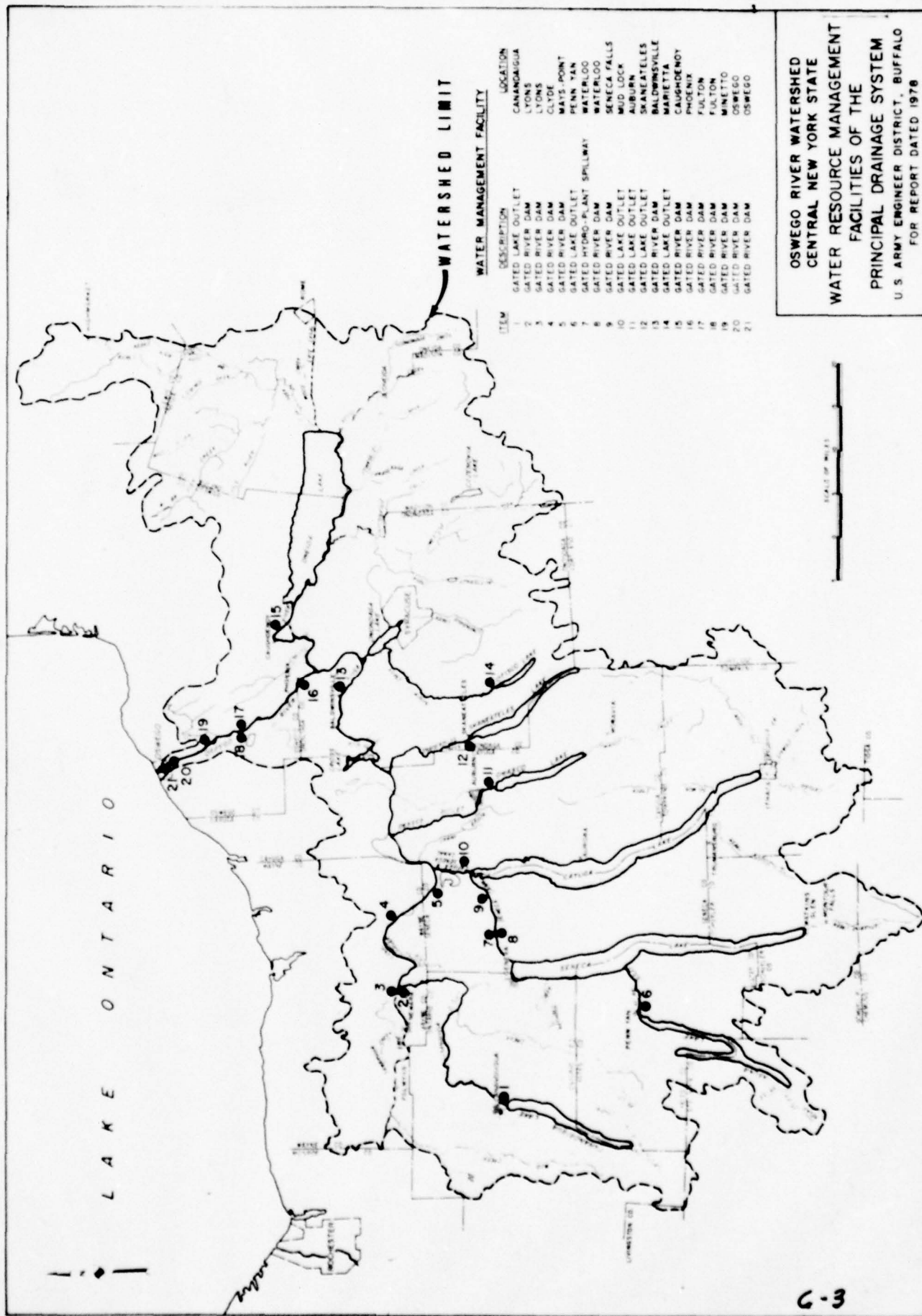
ONEIDA RIVER & ASSOC CANAL

OSWEGO RIVER

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

PRINCIPAL
DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978



WATERSHED LIMIT

WATER MANAGEMENT FACILITY

ITEM	DESCRIPTION	LOCATION
1	GATED LAKE OUTLET	CANANDAIGUA
2	GATED RIVER DAM	LYONS
3	GATED RIVER DAM	LYONS
4	GATED RIVER DAM	CLYDE
5	GATED RIVER DAM	WAVE POINT
6	GATED LAKE OUTLET	PENN. VAN
7	GATED HYDRO-PLANT SPILLWAY	WATERLOO
8	GATED RIVER DAM	SENECA FALLS
9	GATED LAKE OUTLET	MUD LOCK
10	GATED LAKE OUTLET	SKANEATELES
11	GATED LAKE OUTLET	SKANEATELES
12	GATED RIVER DAM	WATERLOO
13	GATED LAKE OUTLET	WATERLOO
14	GATED RIVER DAM	WATERLOO
15	GATED RIVER DAM	WATERLOO
16	GATED RIVER DAM	WATERLOO
17	GATED RIVER DAM	WATERLOO
18	GATED RIVER DAM	WATERLOO
19	GATED RIVER DAM	WATERLOO
20	GATED RIVER DAM	WATERLOO
21	GATED RIVER DAM	WATERLOO

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE
WATER RESOURCE MANAGEMENT
FACILITIES OF THE
PRINCIPAL DRAINAGE SYSTEM
U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

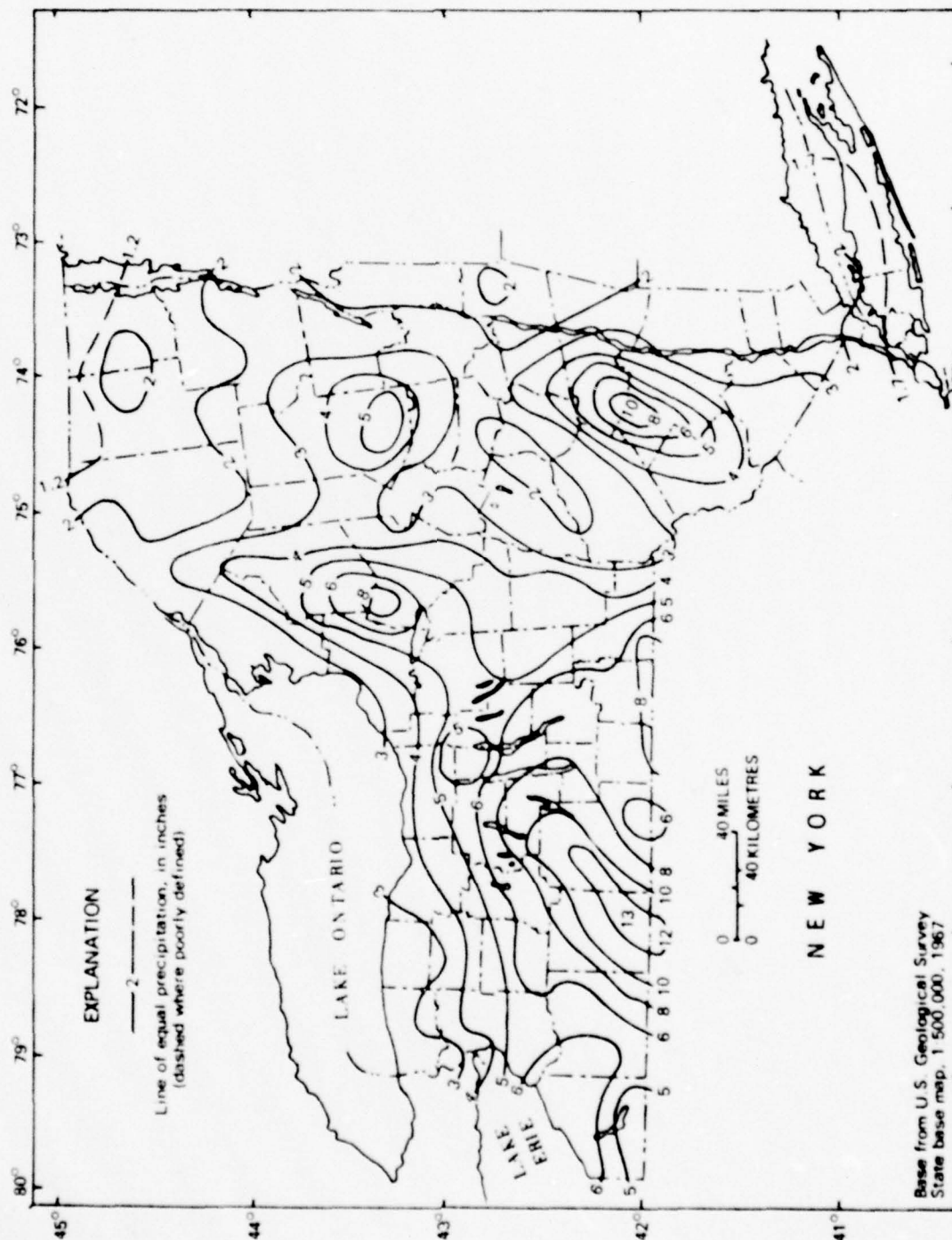
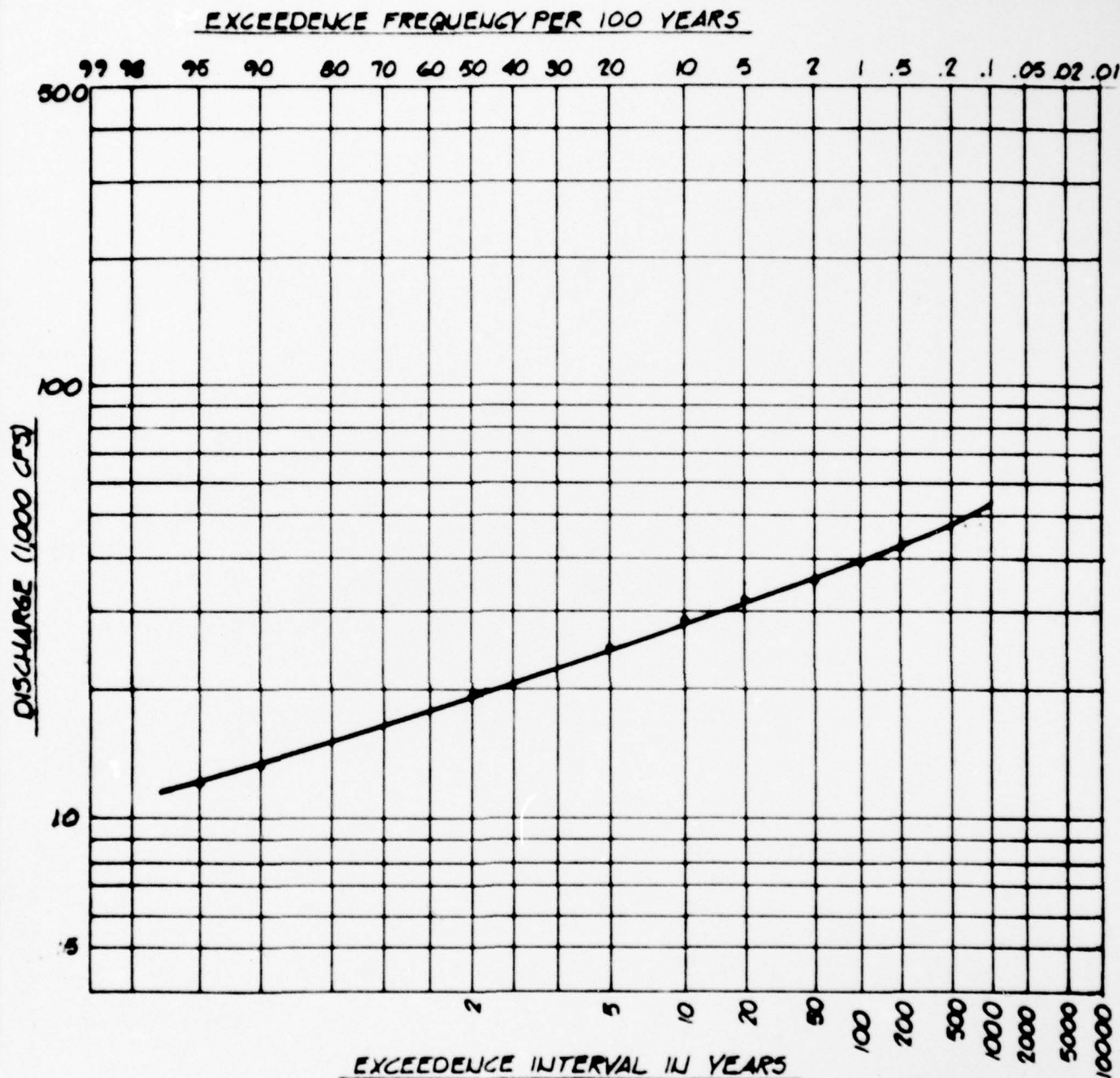


Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)



NOTE: DISCHARGE - FREQUENCY CURVE CONVERTED FROM STAGE - FREQUENCY CURVE, USING STAGE - DISCHARGE RATING CURVES DEVELOPED BY D.E.C.

DISCHARGE - FREQUENCY
CURVE

C-5



STETSON • DALE

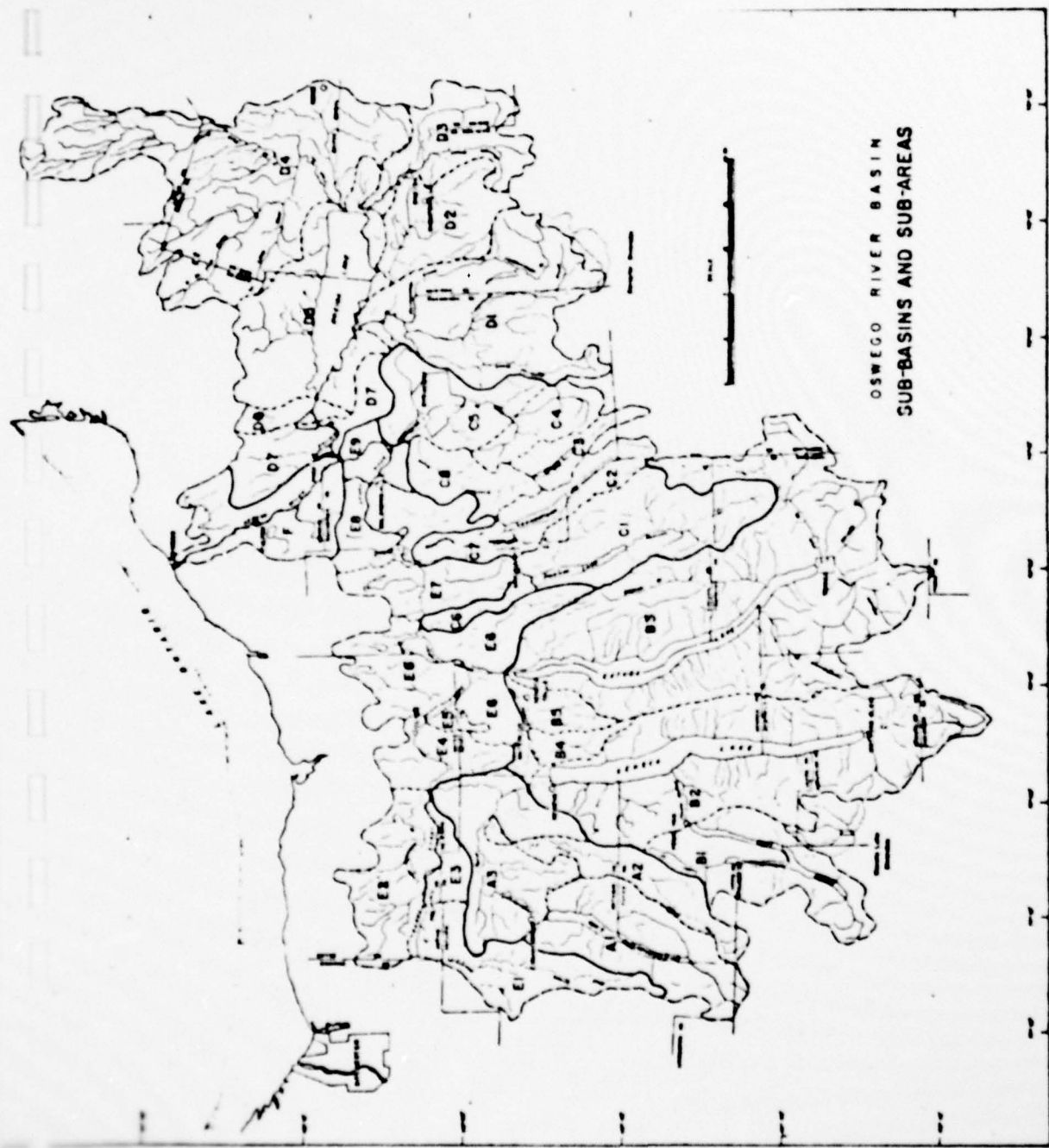
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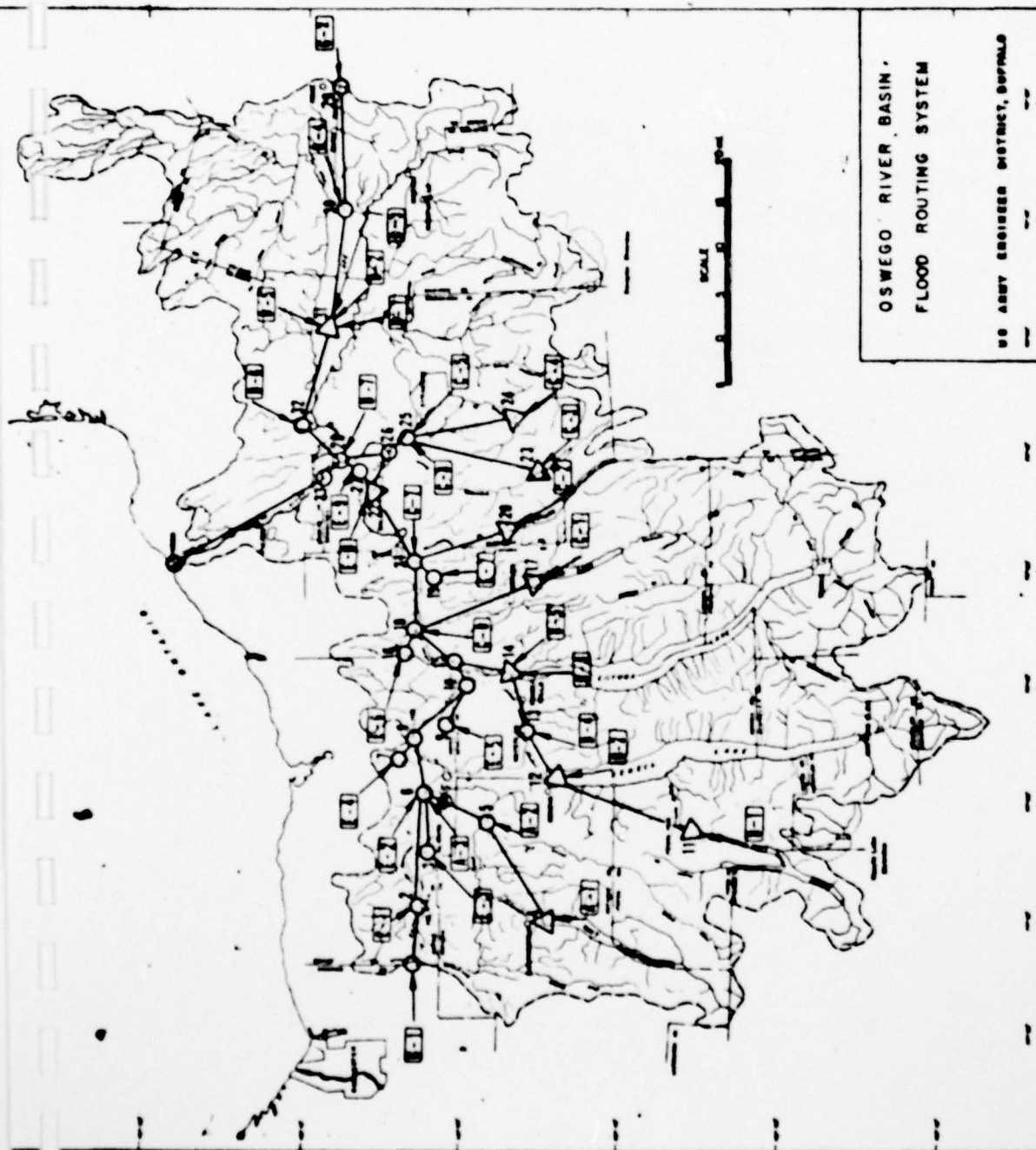
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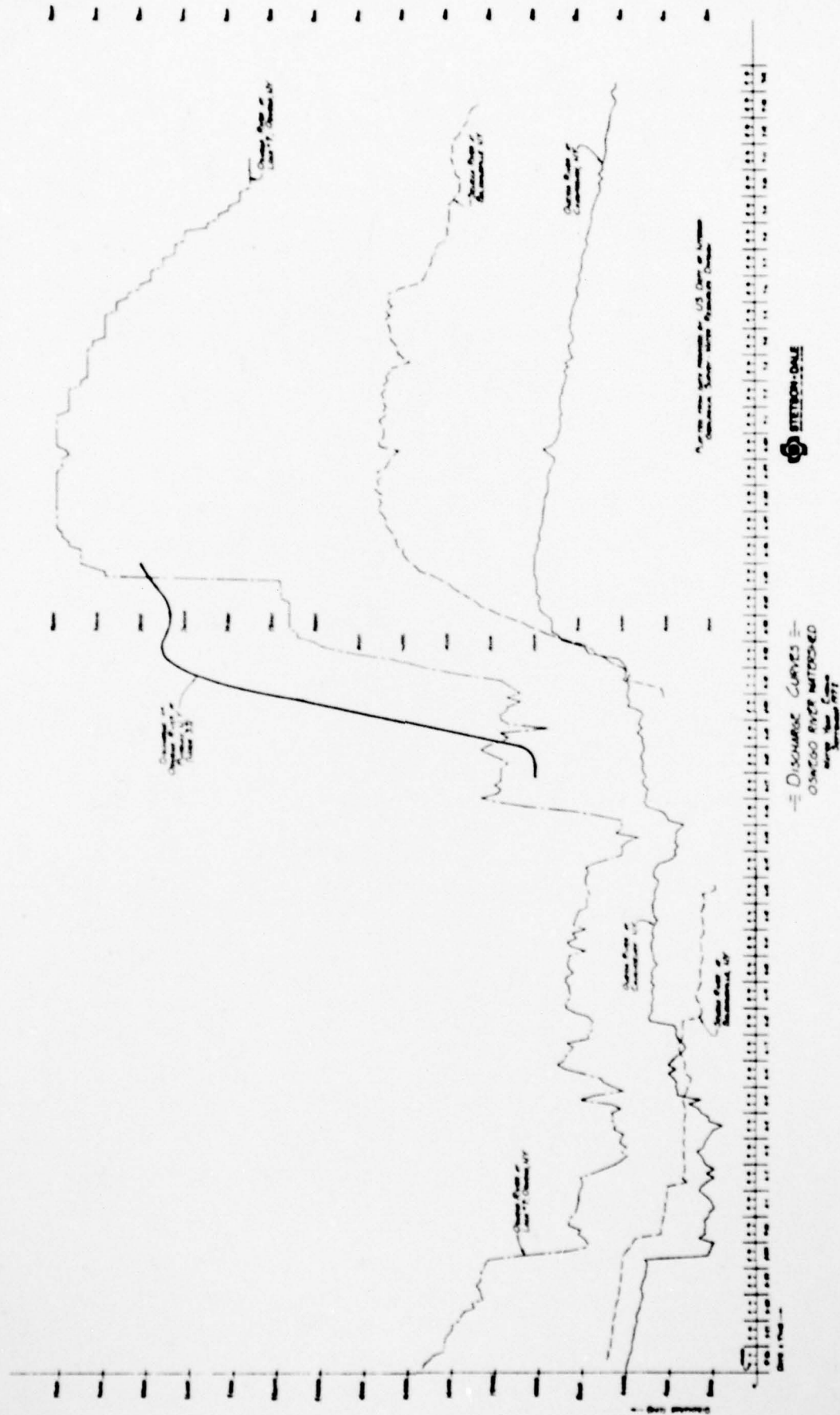
JP6

APP'S

THREE
RIVERS
(NODE 28)







**STETSON • DALE**BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501
TEL 315-797-5800**DESIGN BRIEF**

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-28-79
SUBJECT OSWEGO RIVER CURVED DAM - LOCK #7 PROJECT NO. 2205
DISCHARGE - FREQUENCY RANKING DRAWN BY JPS

<u>WATER YR</u>	<u>PEAK DISCHARGE</u>	<u>DATE</u>	<u>RANKING</u>	<u>DISCHARGE FREQ PPM</u>
1936	37500 CFS	3-28-36	1	.02
1940	35000 CFS	4-10-40	2	.04
1972	32300 CFS	6-27-72	3	.06
1960	31200 CFS	4-4-60	4	.08
1950	29400 CFS	3-30-50	5	.11
1956	26800 CFS	4-13-56	6	.13
1942	25900 CFS	3-18-42	7	.15
1943	25400 CFS	5-15-43	8	.17
1947	25100 CFS	4-8-47	9	.19
1955	23600 CFS	3-23-55	10	.21
1951	23500 CFS	2-22-51	11	.23
1945	23400 CFS	3-26-45	12	.25
1939	23200 CFS	3-8-39	13	.28
1959	23100 CFS	4-6-59	14	.30
1973	23000 CFS	4-7-73	15	.32
1961	22700 CFS	2-26-61	16	.34
1971	22600 CFS	3-18-71	17	.36
1902	22500 CFS	3-13-02	18	.38
1904	22200 CFS	4-02-04	19	.40
1946	22000 CFS	10-4-46	20	.42
1963	21900 CFS	3-28-63	21	.45
1970	21600 CFS	4-6-70	22	.47
1905	21300 CFS	3-28-05	23	.49
1937	21200 CFS	4-24-37	24	.51
1969	20900 CFS	2-4-69	25	.53
1903	20300 CFS	3-35-03	26	.55
1954	20000 CFS	5-9-54	27	.57
1941	19900 CFS	4-7-41	28	.60
1974	19900 CFS	4-7-74	29	.62
1958	19100 CFS	4-23-58	30	.64
1952	18700 CFS	3-12-52	31	.66
1948	18400 CFS	3-26-48	32	.68

**STETSON • DALE**BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501
TEL 315-797-5800**DESIGN BRIEF**PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 6-20-79SUBJECT OSWEGO RIVER CURVED DAM - LOCK #7PROJECT NO. 1305DISCHARGE - FREQUENCY RANKINGDRAWN BY JP

WATER YR	PEAK DISCHARGE	DATE	RANKING	DISCHARGE PLOT Pbs
1968	18100 CFS	6-30-68	33	.70
1953	18000 CFS	3-28-53	34	.72
1938	18000 CFS	3-1-38	35	.74
1966	17600 CFS	3-6-66	36	.77
1964	17500 CFS	3-18-64	37	.79
1955	16900 CFS	7-14-55	38	.81
1934	16400 CFS	4-15-34	39	.83
1949	16300 CFS	2-17-49	40	.85
1944	16000 CFS	4-14-44	41	.87
1957	15200 CFS	3-15-57	42	.89
1962	15200 CFS	3-16-62	43	.91
1900	14900 CFS	4-10-00	44	.94
1965	13200 CFS	4-26-65	45	.96
1967	12900 CFS	5-17-67	46	.98



STETSON • DALE

BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 6-26-79SUBJECT EXPANSION OF STAGE - DISCHARGEPROJECT NO. 2305CURVES TO UPPER LIMITSDRAWN BY JAS & NEDSENECA LAKE

$$Q = \frac{1.49}{n} A R^{4/3} S^{1/2}$$

ASSUME: $n = .085$

HEIGHT	$1.49/n$	A	R	S	Q	STORAGE
10	42.57	10000	10	.001	66745	800000
20	42.57	24000	20	.001	240455	1200000

CANANDAIGUA LAKE

HEIGHT	$1.49/n$	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	106,500
10	42.57	10000	10	.001	62965	212,500
20	42.57	20000	20	.001	200366	319,000

KEUKA LAKE

HEIGHT	$1.49/n$	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	217000
10	42.57	10000	10	.004	111550	328550

CAYUGA LAKE

HEIGHT	$1.49/n$	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.0005	0	727000
3	42.57	15000	3	.0005	29810	854500
6	42.57	30000	6	.0005	94050	982000

OWASCO LAKE

HEIGHT	$1.49/n$	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.006	0	119800
3	42.57	3000	3	.006	20,653	126500
6	42.57	6000	6	.006	65,720	152900
9	42.57	9000	9	.006	129,350	203700

**STETSON • DALE**BANKERS TRUST BUILDING
UTICA • NEW YORK • 13501
TEL 315-797-5800**DESIGN BRIEF**PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 6-27-79SUBJECT EXPANSION OF STAGE - DISCHARGEPROJECT NO 1205CURVES TO UPPER LIMITSDRAWN BY JPGOTISCO LAKE

HEIGHT	149/7	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	39,200
3	42.57	900	3	.004	5060	45700
6	42.57	1800	6	.004	16100	52300
9	42.57	2700	9	.004	31700	58800
12	42.57	3600	12	.004	51200	65300

ONONDAGA LAKE

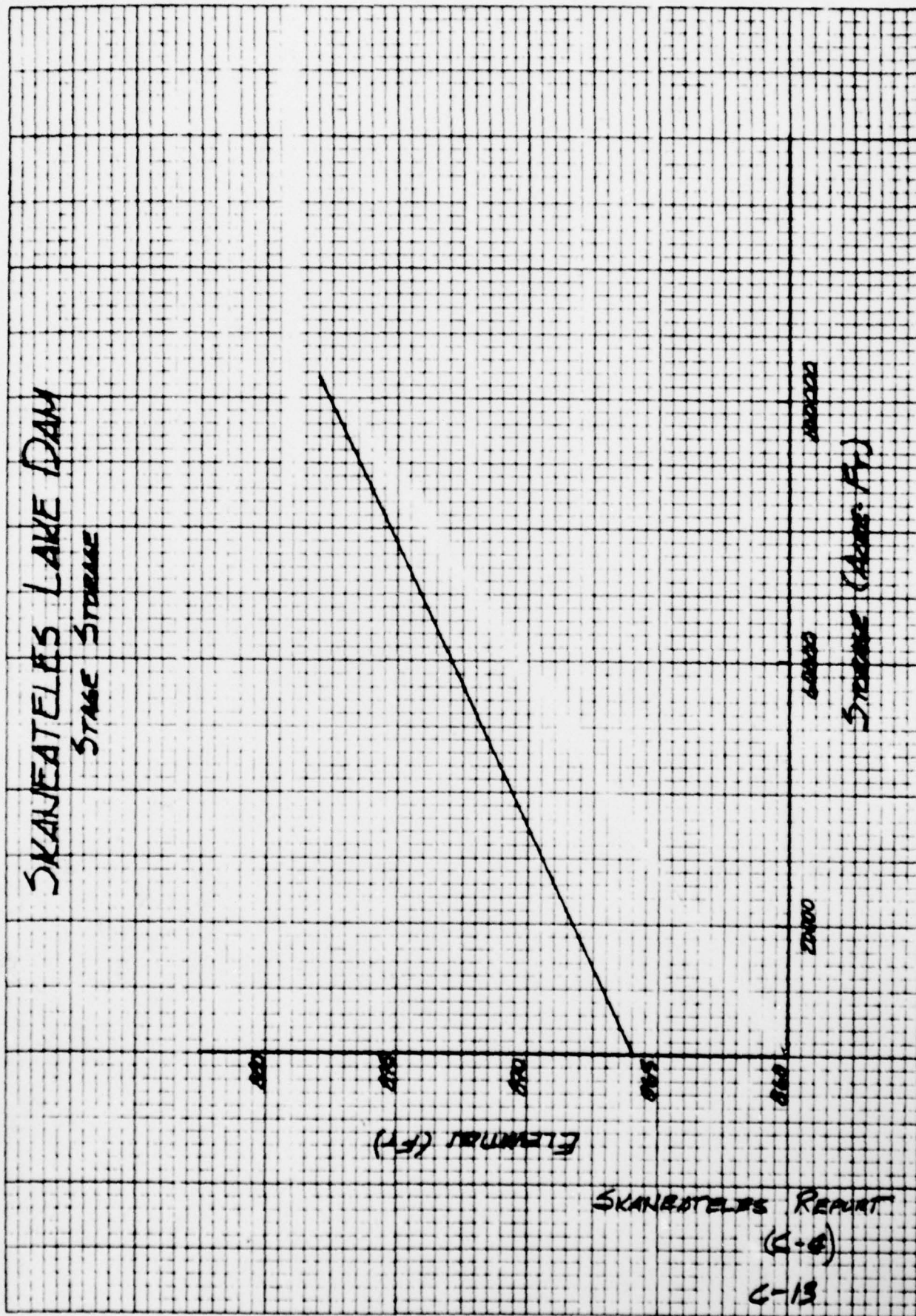
HEIGHT	149/7	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	32500
3	42.57	1500	3	.001	4200	43500
6	42.57	3000	6	.001	13400	52300
9	42.57	4500	9	.001	26400	62200
12	42.57	6000	12	.001	42700	72100

ONEIDA LAKE

HEIGHT	149/7	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	103600	1304000

SKANEATELES LAKESEE SKANEATELES DAM INSPECTION REPORT DATE: SEPT 14/
SHEETS C-4 & C-5

SKANEATELES LAKE DAM STAGE STORM



SKANEATELES REPORT

(K-6)

C-13

**STETSON • DALE**BANKERS TRUST BUILDING
UTICA • NEW YORK • 13801
TEL 315-797-5800**DESIGN BRIEF**

PROJECT NAME NY DAM INSPECTION DATE 2-12-78
SUBJECT SKANEATELES LAKE DAM PROJECT NO. 2210
DRAWN BY JRG

STAGE - DISCHARGE TABULATION (FROM CREST OF SPILLWAY)

<u>ELEV</u>	<u>PRINCIPAL ^Q SPILLWAY</u>	<u>^Q DAM</u>	<u>^Q TOTAL</u>
846	—	—	—
847	124.80	—	124.80
848	352.99	—	352.99
848.5 (Top of Dam)	493.32	—	493.32
849	648.48	98.11	746.59
870	998.40	509.80	1508.20
871	1392.31	1096.92	2489.23
872	1834.18	1817.04	3651.22
873	2311.33	2649.00	4960.33
874	2823.90	3579.37	6403.27
875	3369.60	4588.68	7958.28
876	3946.52	5699.74	9646.26
877	4553.06	6876.88	11429.94
878	5187.84	8125.47	13313.31
879	5849.65	9491.63	15291.28
880	6537.42	10822.06	17359.48

SKANEATELES REPORT
(C-5)

C-1A

OSWEGO RIVER BASIN											
HEC100											
PMF - OVERFLOW ANALYSIS											
1A	40	6	0	0	0	0	0	0	0	0	4
A	5										
A	1	6	1								
B1	.2	.4	.5	.4	.8	1.0					
K	0	1	0	0	0	1					
K1	1 BARGE CANAL LOCK 30 AT RACEDON (SUB-AREA A1)										
H	-1	0	100	0	5100	0	0	0	0	1	
H	372	372	372	372	374	370	379	379	386	392	
H	390	300	375	372	113	23	25	21	21	22	
H	22	21	22	22	21	21	22	22	22	0	
H											
K	1	2	0	0	0	0	1				
K1	2 BARGE CANAL LOCK 29 PALATKA (ROUTED FLOW FROM LOCK 30)										
T	0	0	0	0	1						
T1	0	3	1								
K	0	2	0	0	0	0	1				
K1	3 CANAGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)										
H	1	-1	147	0	5100	0	0	0	0	1	
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	0.5	0.05			
U	21										
I	514	1944	2950	2655	1978	1472	1095	815	515	309	
I	364	250	184	130	103	76	57	42	25	25	
I	21										
I	140	550	1.6								
K	2	2	0	0	0	0	1				
K1	4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29										
K	1	6	0	0	0	0	1				
K1	5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS										
T	0	0	0	0	1						
T1	0	0	3								
K	0	6	0	0	0	0	1				
K1	6 LOWER CANAGUA CREEK LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)										
H	1	-1	110	0	5100	0	0	0	0	1	
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	0.5	0.05			
U	27										
I	28	109	293	523	696	773	896	980	1244	1312	
I	1210	979	764	596	445	363	283	221	173	135	
I	105	82	64	50	39	35	35				
I	120	470	1.6								
K	2	6	0	0	0	0	1				
K1	7 COMBINED AND LOCAL FLOWS AT LOCK 27										
K	0	3	0	0	0	0	1				
K1	8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)										
H	1	-1	51	0	5100	0	0	0	0	1	
P	0	21.5	33	47	55	65	72	74			
T	0	0	0	0	0	0	0.5	0.05			
U	10										
I	2001	1630	844	303	174	79	36	20	25	16	
I	100	200	1.6								
K	1	6	0	0	0	0	1				

K1	9 ROUTED FLOW E-3 TO LYONS (NODE 6)									
T	0	0	0	0	1					
T1	0	5	2							
K	2	4	0	0	0	0	0	1		
K1	10 COMBINE FLOWS AT NODE 6									
K	0	4	0	0	0	0	0	1		
K1	11 CANANDAIGUA LAKE INFLOW									
R	1	-1	184	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	1.25	0.03		
U	0									
I	8534	5183	3240	1507	691	314	145	30		
I	300	1000	1.4							
K	1	4	0	0	0	0	0	1		
K1	12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD									
T	0	0	0	1	1					
T1	0	0	0	0	0	0	51000			
T2	10700	21300	31900	42500	53100	63700	74300	84900	95500	106100
T22	12500	319000								
T3	50	50	50	50	200	600	1000	1540	2250	3000
T3	63000	200366								
K	1	5	0	0	0	0	0	1		
K1	13 ROUTED OUTFLOW TO FLINT CREEK MOUTH									
T	0	0	0	0	1					
T1	0	12	5							
K	0	5	0	0	0	0	0	1		
K1	14 FLINT CREEK INFLOW A-2									
R	1	-1	182	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	26									
I	93	534	983	1266	1367	1166	966	801	663	549
I	455	377	311	259	215	178	147	104	101	84
I	69	57	47	39	35	32				
I	90	2000	1.4							
K	2	5	0	0	0	0	0	1		
K1	15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS									
K	1	54	0	0	0	0	0	1		
K1	16 OUTLET ROUTED TO LOCK 27									
T	0	0	0	0	1					
T1	0	7	3							
K	0	54	0	0	0	0	0	1		
K1	17 OUTLET LOCAL FLOW A-3									
R	1	-1	155	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.6	0.06		
U	22									
I	91	330	985	1340	1718	2400	2601	1921	1413	1030
I	763	562	412	303	223	164	120	90	65	48
I	35	34								
I	150	200	1.4							
K	2	54	0	0	0	0	0	1		
K1	18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27									
K	1	4	0	0	0	0	0	1		
K1	19 ROUTE OUTLET TO CANAL									
T	0	0	0	0	1					
T1	0	1								
K	2	4	0	0	0	0	0	1		
K1	20 COMBINE FLOW AT 61 OUTLET FLOW + E-1, E-2, E-31									
K	1	0	0	0	0	0	0	1		
K1	21 ROUTE FLOWS AT LOCK 27 TO NODE 8									
T	0	0	0	0	1					
T1	0	0	3							
K	0	7	0	0	0	0	0	1		
K1	22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)									
R	1	-1	89	0	5100	0	0	0	1	

V	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	23									
I	897	1670	1441	1144	900	721	572	454	361	287
I	227	181	143	114	90	72	57	45	36	29
I	23	23	23							
I	100	360	1.6							
K	1	0	0	0	0	0	1			
K1	23	ROUTE FLOWS AT LOCK 26 TO NODE 8								
T	0	0	0	0	1					
T1	0	2								
K	2	0	0	0	0	0	1			
K1	24	COMBINE ROUTED AND LOCAL FLOWS AT NODE 8								
K	1	10	0	0	0	0	1			
K1	25	ROUTE FLOWS AT NODE 8 TO NODE 10								
T	0	0	0	0	1					
T1	0	5	2							
K	0	9	0	0	0	0	1			
K1	26	LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)								
H	1	-1	18	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	21									
I	171	304	313	246	193	152	119	93	73	58
I	45	35	28	22	17	13	11	8	6	5
I	4									
I	90	90	1.6							
K	1	10	0	0	0	0	1			
K1	27	ROUTE INFLOW E-5 TO NODE 10								
T	0	0	0	0	1					
T1	0	2								
K	2	10	0	0	0	0	1			
K1	28	COMBINE ROUTED FLOW WITH FLOW AT NODE 10								
K	1	15	0	0	0	0	1			
K1	29	ROUTE FLOWS AT NODE 10 TO NODE 15								
T	0	0	0	0	1					
T1	0	5	2							
K	0	11	0	0	0	0	1			
K1	30	LOCAL INFLOW B-1 INTO KEUKA LAKE								
H	1	-1	183	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	1.50	0.03		
U	6									
I	14318	3342	1273	483	183	0				
I	100	800	1.6							
K	1	11	0	0	0	0	1			
K1	31	KEUKA LAKE OUTFLOW W/ MODIFIED PULS								
T	0	0	0	1	1					
T1	0	0	0	0	0	0	147000			
T2107000	129500	141000	152500	172000	178000	191000	204000	217000		
T2328550										
T3126000	120	320	445	530	575	670	890	1130	1470	
K	1	12	0	0	0	0	1			
K1	32	ROUTE KEUKA LAKE OUTFLOWS TO 12								
T	0	0	0	0	1					
T1	0	6	2							
K	0	12	0	0	0	0	1			
K1	33	SENECA LAKE INFLOWS B-2								
H	1	-1	524	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.03		
U	12									
I	26993	10831	6899	4332	2720	1700	1072	673	422	266
I	167	70								
I	500	2000	1.6							

K	1	2	12	0	0	0	0	0	1
K1	34	COMBINE LOCAL FLOW B-2 AND ROUTED KEONA LAKE OUTLET FLOWS							
K	1	12	0	0	0	0	0	0	1
K1	35	SENECA LAKE OUTFLOWS - MODIFIED PULS METHOD							
T	0	0	0	1	1				
T1								534000	
I	2372000	414000	456000	500000	543000	586000	630000	650000	674000
I2	12000000	1200000							
I3	700	700	700	700	700	700	700	1000	3000
I3	15000	77000							
K	1	13	0	0	0	0	0	0	1
K1	36	SENECA LAKE OUTFLOWS ROUTED TO 13							
T	0	0	0	0	1				
T1	0	2							
K	0	13	0	0	0	0	0	0	1
K1	37	LOCAL INFLOW B-4							
R	1	-1	39	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.5	0.05	
U	15								
I	539	1094	796	549	378	260	179	123	85
I	40	20	19	11	11				
I	92	200	1.6						
K	2	13	0	0	0	0	0	0	1
K1	38	COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4							
K	1	14	0	0	0	0	0	0	1
K1	39	ROUTE HYDROGRAPH TO 14 (CATUGA LAKE INFLOW)							
T	0	0	0	0	1				
T1	0	6	2						
K	0	14	0	0	0	0	0	0	1
K1	40	LOCAL INFLOW B-5							
R	1	-1	36	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.5	0.05	
U	12								
I	895	1094	692	437	277	175	110	70	44
I	14	10							
I	92	200	1.6						
K	2	14	0	0	0	0	0	0	1
K1	41	COMBINE FLOW B-5 WITH ROUTED FLOW							
K	0	14	0	0	0	0	0	0	1
K1	42	CATUGA LAKE INFLOW B-3							
R	1	-1	782	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.5	0.05	
U	15								
I	24903	15540	13526	9524	6529	4476	3049	2104	1443
I	678	445	319	219	81				
I	1000	1700	1.6						
K	2	14	0	0	0	0	0	0	1
K1	43	COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW							
K	1	14	0	0	0	0	0	0	1
K1	44	CATUGA LAKE OUTFLOW - MODIFIED PULS							
T	0	0	0	1	1				
T1	0	0	0	0	0	0	0	490000	
I	2375000	417000	460000	507000	546000	589500	634000	660000	727000
I2	982000								
I3	1700	1700	1700	1700	2400	2400	2400	8700	8700
I3	30510	103500							
K	1	15	0	0	0	0	0	0	1
K1	45	ROUTE CATUGA LAKE OUTFLOWS TO NODE 15							
T	0	0	0	0	1				
T1	0	7	1						
K	2	15	0	0	0	0	0	0	1
K1	46	COMBINE ROUTED FLOW WITH FLOW AT NODE 15							
K	1	10	0	0	0	0	0	0	1

K1	47 ROUTE FLOWS TO NODE 18									
T	0	0	0	0	1					
T1	0	0	3							
K	0	16	0	0	0	0	1			
K1	48 LOCAL FLOW E-6									
H	1	-1	191	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	16									
I	2051	5102	3130	2469	1710	1175	800	555	381	262
I	100	123	85	75	70	27				
I	140	400	1.6							
K	1	18	0	0	0	0	1			
K1	49 ROUTE LOCAL FLOW E-6 TO NODE 18									
T	0	0	0	0	1					
T1	0	2								
K	2	18	0	0	0	0	1			
K1	50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18									
K	0	17	0	0	0	0	1			
K1	51 HEAD OMASCO INFLOW C-1									
H	1	-1	201	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.75	.05		
U	10									
I	6633	5870	4280	2273	1200	633	334	176	93	30
I	450	1000	1.6							
K	1	17	0	0	0	0	1			
K1	52 OMASCO LAKE INFLOWS - MODIFIED PULS METHOD									
T	0	0	0	1	1					
T1	0	0	0	0	0	0	92000			
T2	66000	73200	79900	86500	93200	99800	106500	113200	119800	126500
T2152900	205700									
T3	600	600	600	1100	1700	2300	2860	3400	3400	3400
T3	24000	69100								
K	1	18	0	0	0	0	1			
K1	53 ROUTE OMASCO LAKE OUTLET FLOWS									
T	0	0	0	0	1					
T1	0	7	3							
K	2	18	0	0	0	0	1			
K1	54 COMBINE FLOWS WITH FLOWS AT NODE 18									
K	0	18	0	0	0	0	1			
K1	55 HEAD LOCAL FLOW C-6									
H	1	-1	19	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	10									
I	157	368	352	268	285	156	119	91	70	53
I	40	26	23	18	14	10	0	6		
I	90	200	1.6							
K	2	18	0	0	0	0	1			
K1	56 COMBINE LOCAL FLOW C-6 WITH FLOW AT NODE 18									
K	1	21	0	0	0	0	1			
K1	57 ROUTE FLOW AT 18 TO NODE 21									
T	0	0	0	0	1					
T1	0	7	3							
K	0	19	0	0	0	0	1			
K1	58 LOCAL INFLOW E-7									
H	1	-1	98	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	0.5	0.06		
U	11									
I	2769	3130	1870	1115	644	396	236	141	84	50
I	19									
I	120	400	1.6							
K	1	21	0	0	0	0	1			
K1	59 ROUTE LOCAL FLOW TO NODE 21									

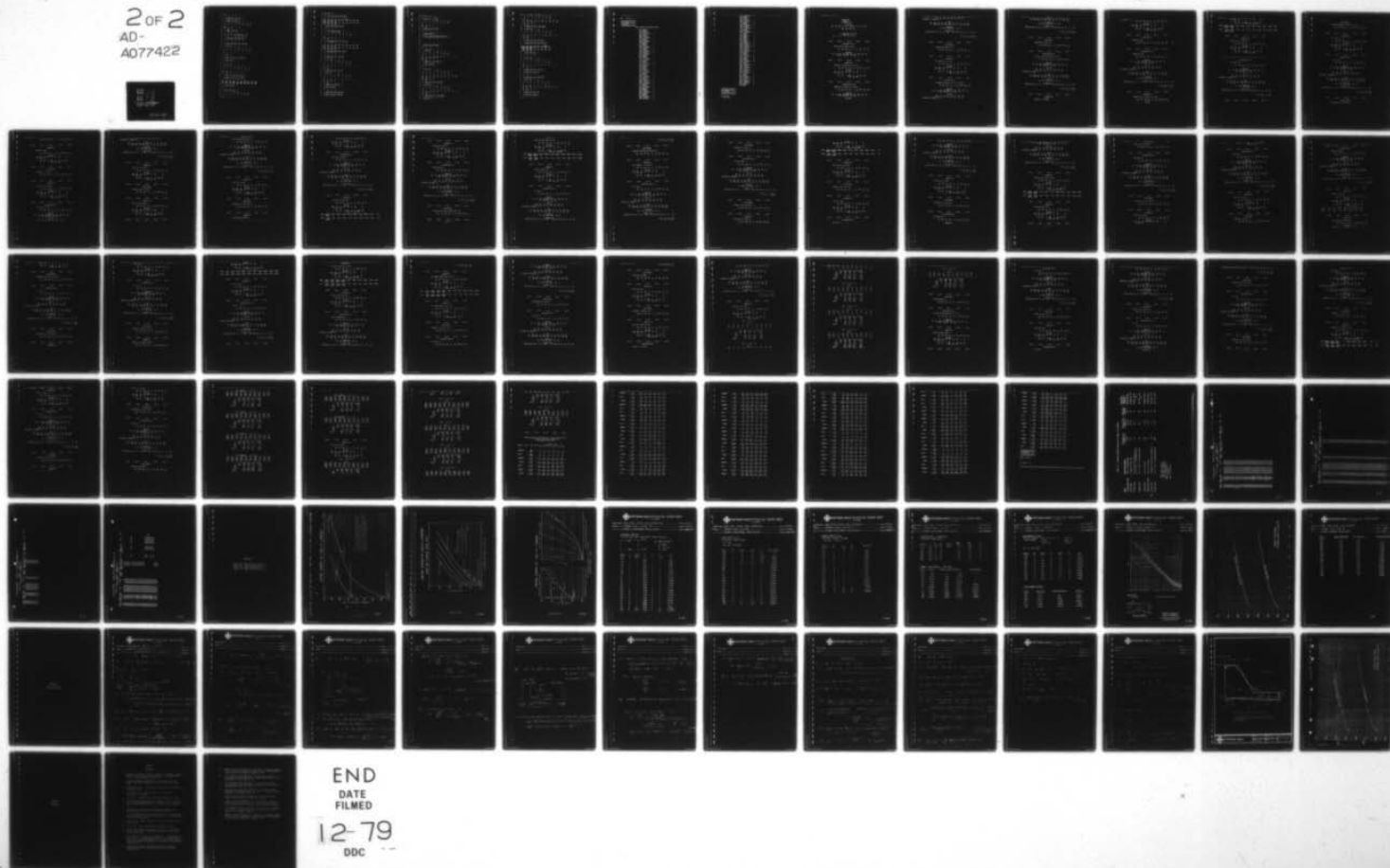
AD-A077 422

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. PHOENIX DAM-LOCK 1 (INVENTORY NUMB--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED

NL

2 of 2
AD-
A077422





NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

T	0	0	0	0	1				
T1	0	4	2						
K	2	21	0	0	0	0	1		
K1	60	COMBINE ROUTED FLOW WITH FLOW AT Z1							
K	0	20	0	0	0	0	1		
K1	61	SHAMATELES LAKE INFLOWS							
R	1	-1	74	0	5100	0	0	0	1
P	0	21.5	33	47	35	65	72	74	
T	0	0	0	0	0	0	0.75	0.05	
U	5								
I	4829	791	232	56	10				
I	230	500	1.4						
K	1	20	0	0	0	0	1		
K1	62	SHAMATELES LAKE OUTFLOWS							
T	0	0	0	1	1				
T1	0	0	0	0	0	0	0		
T2	0	17323	34756	52104	104368	200736	243492		
T3	0	353	747	1500	6403	13313	17359		
K	1	21	0	0	0	0	1		
K1	63	ROUTE SHAMATELES LAKE OUTFLOWS TO NODE Z1							
T	0	0	0	0	1				
T1	0	4	2						
K	2	21	0	0	0	0	1		
K1	64	COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE Z1							
K	0	21	0	0	0	0	1		
K1	65	LOCAL FLOW C-7							
R	1	-1	27	0	5100	0	0	0	1
P	0	21.5	33	47	35	65	72	74	
T	0	0	0	0	0	0	0.5	0.04	
U	11								
I	496	946	501	351	212	127	77	46	28
I	7								
I	90	200	1.4						
K	2	21	0	0	0	0	1		
K1	66	COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE Z1							
K	1	22	0	0	0	0	1		
K1	67	ROUTING TO NODE Z2							
T	0	0	0	0	1				
T1	0	4	1						
K	0	22	0	0	0	0	1		
K1	68	LOCAL FLOW E-8							
R	1	-1	98	0	5100	0	0	0	1
P	0	21.5	33	47	35	65	72	74	
T	0	0	0	0	0	0	0.5	0.04	
U	7								
I	4007	3059	1402	642	259	135	42		
I	120	400	1.4						
K	2	22	0	0	0	0	1		
K1	69	COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE Z2							
K	1	22	0	0	0	0	1		
K1	70	BALDWINVILLE POOL - MODIFIED PULS METHOD							
T	0	0	0	1	1				
T1	0	0	0	0	0	0	3250		
T2	3250	5000	8400	10000	11700	14000	17000	20000	24000
T3	3000	4000	6000	8000	10000	12000	14000	15300	16600
K	1	24	0	0	0	0	1		
K1	71	ROUTE FLOW TO NODE Z4							
T	0	0	0	0	1				
T1	0	4	1						
K	0	23	0	0	0	0	1		
K1	72	INFLOW TO OTISCO LAKE C-3							
R	1	-1	42.7	0	5100	0	0	0	1
P	0	21.5	33	47	35	65	72	74	
T	0	0	0	0	0	0	0.75	0.05	
U	6								
I	3092	913	397	137	55	9			

K	1	23	0	0	0	0	1			
K1	73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD									
T	0	0	0	1	1	0	0	29300		
T1	0	0	0	0	0	0	0	29300		
T2	19600	21000	22900	26100	28300	30500	32600	34800	37000	39200
T2	43700	52300	58000	65300						
T3	200	200	200	200	200	400	900	1600	2000	2000
T3	7060	10100	33700	53200						
K	1	25	0	0	0	0	1			
K1	74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25									
T	0	0	0	0	1					
T1	0	10	4							
K	0	24	0	0	0	0	1			
K1	75 INFLOW INTO ONONDAGA RESERVOIR C-4									
R	1	-1	60	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	1.5	0.06		
U	6									
I	2010	3341	1250	435	151	57				
I	250	300	1.6							
K	1	24	0	0	0	0	1			
K1	76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD									
T	0	0	0	1	1	0	0			
T1	0	0	0	0	0	0	0			
T2	0	100	700	1900	3500	7900	10200	22200	27000	32500
T2	43400	52300	62200	72100						
T3	00	430	640	800	1070	1420	1770	1940	2000	2000
T3	6200	15400	28400	44700						
K	1	25	0	0	0	0	1			
K1	77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25									
T	0	0	0	0	1					
T1	0	0	3							
K	2	25	0	0	0	0	1			
K1	78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25									
K	0	25	0	0	0	0	1			
K1	79 LOCAL INFLOW C-5									
R	1	-1	102	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	1.25	0.06		
U	11									
I	2671	3249	2870	1215	727	436	261	156	77	56
I	27									
I	250	500	1.6							
K	2	25	0	0	0	0	1			
K1	80 COMBINE ROUTED FLOWS, LOCAL INFLOW									
K	0	25	0	0	0	0	1			
K1	81 LOCAL FLOW C-8									
R	1	-1	72	0	5100	0	0	0	1	
P	0	21.5	33	47	55	65	72	74		
T	0	0	0	0	0	0	1.0	.06		
U	14									
I	459	1455	1054	1454	926	590	376	239	152	97
I	62	39	25	12						
I	250	300	1.6							
K	2	25	0	0	0	0	1			
K1	82 COMBINE LOCAL FLOW AT NODE 25									
K	1	26	0	0	0	0	1			
K1	83 ROUTE FLOWS TO NODE 26									
T	0	0	0	0	1					
T1	0	0	3							
K	2	26	0	0	0	0	1			
K1	84 COMBINE ROUTED FLOW AND FLOW AT NODE 26									
K	1	20	0	0	0	0	1			
K1	85 ROUTE FLOWS TO NODE 20 (THREE RIVERS)									
T	0	0	0	0	1					

TI	0	0	2						
K	0	27	0	0	0	0	1		
K1	86 LOCAL FLOW (E-9) AT NODE 27								
N	1	-1	37	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.5	0.06	
U	6								
I	2140	1119	437	171	67	11			
E	100	150	1.6						
K	1	20	0	0	0	1			
K1	87 ROUTE LOCAL FLOW E-9 TO NODE 20								
T	0	0	0	0	1				
TI	0	3	1						
K	2	20	0	0	0	0	1		
K1	88 COMBINE HYDROGRAPHS AT 20								
K	0	29	0	0	0	0	1		
K1	89 INFLOWS TO DARGE CANAL FROM EASTERN END OF BASIN (G-2)								
N	-1	0	100	0	5100	0	0	0	1
H									
H									
H									
K	1	30	0	0	0	0	1		
K1	90 ROUTE FLOW AT NODE 29 TO NODE 30								
T	0	0	0	0	1				
TI	0	7	3						
K	0	30	0	0	0	0	1		
K1	91 LOCAL INFLOW D-4								
N	1	-1	529	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.25	0.06	
U	15								
I	940	4797	11090	12700	10200	6513	4014	2473	1524
I	579	354	220	140	102				939
E	000	3960	1.6						
K	2	30	0	0	0	0	1		
K1	92 COMBINE LOCAL FLOW WITH ROUTED FLOW								
K	1	31	0	0	0	0	1		
K1	93 ROUTE FLOWS TO NODE 31								
T	0	0	0	0	1				
TI	0	1							
K	0	31	0	0	0	0	1		
K1	94 LOCAL FLOW D-3								
N	1	-1	144	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.25	0.06	
U	24								
I	370	1076	2155	2396	2356	1742	1289	953	705
I	306	206	103	156	115	85	63	47	34
I	30	30	30	24					30
E	320	1000	2.0						
K	2	31	0	0	0	0	1		
K1	95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31								
K	0	31	0	0	0	0	1		
K1	96 LOCAL FLOW D-2								
N	1	-1	105	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.25	0.06	
U	14								
I	353	1062	2750	2357	1404	929	501	363	227
I	09	49	35	10					142
E	240	000	1.6						
K	2	31	0	0	0	0	1		
K1	97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31								
K	0	31	0	0	0	0	1		
K1	98 LOCAL FLOW D-1								

N	1	-1	200	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.25	0.06	
U	24								
I	103	504	1042	1512	2516	3750	4112	4139	3602
I	1916	1204	866	727	527	320	276	200	145
I	76	55	50	50					105
I	600	2160	1.4						
K	2	31	0	0	0	0	1		
K1	99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31								
K	0	31	0	0	0	0	1		
K1	100 LOCAL FLOW D-5								
N	1	-1	269	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.25	0.05	
U	12								
I	12227	5035	4245	2505	1574	950	503	355	216
I	80	36							132
I	540	2000	1.4						
K	2	31	0	0	0	0	1		
K1	101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31								
K	1	31	0	0	0	0	1		
K1	102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD								
T	0	0	0	1	1				
T1	0	0	0	0	0	0	670000		
T2	442000	635000	640000	650000	680000	725000	806000	845000	
T3	910000	1150000	1304000						
T3	1000	1000	2000	4000	6000	8000	10000	11000	
T3	27900	64700	116600						
K	1	32	0	0	0	0	1		
K1	103 ROUTE FLOWS TO NODE 32								
T	0	0	0	0	1				
T1	0	1							
K	0	32	0	0	0	0	1		
K1	104 LOCAL FLOW D-6								
N	1	-1	20	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	74	
T	0	0	0	0	0	0	0.5	0.06	
U	15								
I	274	531	601	491	320	232	160	110	74
I	36	25	10	12	7				52
I	70	210	1.4						
K	2	32	0	0	0	0	1		
K1	105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32								
K	1	32	0	0	0	0	1		
K1	106 ROUTE FLOW AT 32 TO NODE 20								
T	0	0	0	0	1				
T1	0	4	2						
K	2	20	0	0	0	0	1		
K1	107 COMBINE ROUTED FLOW WITH FLOW AT NODE 20								
K	0	20	0	0	0	0	1		
K1	108 LOCAL FLOW D-7								
N	1	-1	110	0	5100	0	0	0	1
P	0	21.5	33	47	55	65	72	77	
T	0	0	0	0	0	0	0.5	0.06	
U	24								
I	402	1407	1000	1072	1496	1127	849	536	402
I	273	206	155	117	80	67	50	38	28
I	20	20	20	0					22
I	250	900	2.0						
K	2	20	0	0	0	1	1		
K1	109 COMBINE WITH FLOW AT NODE 20								
K	1	32	0	0	0	1	1		
K1	110 ROUTE FLOW AT 20 TO NODE 33								
T	0	0	0	0	1				
T1	0	3	1						

ROUT 14:31 JAN 27, '79

FLOOD HYDROGRAPH PACKAGE (HEC-1)
FOR SAFETY VERSION JULY 1970
LAST MODIFICATION 26 FEB 79

1

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	2
RUNOFF HYDROGRAPH AT	2
COMBINE 2 HYDROGRAPHS AT	2
ROUTE HYDROGRAPH TO	6
RUNOFF HYDROGRAPH AT	6
COMBINE 2 HYDROGRAPHS AT	6
RUNOFF HYDROGRAPH AT	3
ROUTE HYDROGRAPH TO	6
COMBINE 2 HYDROGRAPHS AT	6
RUNOFF HYDROGRAPH AT	4
ROUTE HYDROGRAPH TO	4
ROUTE HYDROGRAPH TO	5
RUNOFF HYDROGRAPH AT	5
COMBINE 2 HYDROGRAPHS AT	5
ROUTE HYDROGRAPH TO	56
RUNOFF HYDROGRAPH AT	56
COMBINE 2 HYDROGRAPHS AT	56
ROUTE HYDROGRAPH TO	6
COMBINE 2 HYDROGRAPHS AT	6
ROUTE HYDROGRAPH TO	8
RUNOFF HYDROGRAPH AT	7
ROUTE HYDROGRAPH TO	8
COMBINE 2 HYDROGRAPHS AT	8
ROUTE HYDROGRAPH TO	10
RUNOFF HYDROGRAPH AT	9
ROUTE HYDROGRAPH TO	10
COMBINE 2 HYDROGRAPHS AT	10
ROUTE HYDROGRAPH TO	15
RUNOFF HYDROGRAPH AT	11
ROUTE HYDROGRAPH TO	11
ROUTE HYDROGRAPH TO	12
RUNOFF HYDROGRAPH AT	12
COMBINE 2 HYDROGRAPHS AT	12
ROUTE HYDROGRAPH TO	12
ROUTE HYDROGRAPH TO	13
RUNOFF HYDROGRAPH AT	13
COMBINE 2 HYDROGRAPHS AT	13
ROUTE HYDROGRAPH TO	14
RUNOFF HYDROGRAPH AT	14
COMBINE 2 HYDROGRAPHS AT	14
RUNOFF HYDROGRAPH AT	14
COMBINE 2 HYDROGRAPHS AT	14
ROUTE HYDROGRAPH TO	14
ROUTE HYDROGRAPH TO	15
COMBINE 2 HYDROGRAPHS AT	15
ROUTE HYDROGRAPH TO	16
RUNOFF HYDROGRAPH AT	16
ROUTE HYDROGRAPH TO	18
COMBINE 2 HYDROGRAPHS AT	18
RUNOFF HYDROGRAPH AT	17
ROUTE HYDROGRAPH TO	17
ROUTE HYDROGRAPH TO	18
COMBINE 2 HYDROGRAPHS AT	18
RUNOFF HYDROGRAPH AT	18

COMBINE 2 HYDROGRAPHS AT	19
ROUTE HYDROGRAPH TO	21
RUNOFF HYDROGRAPH AT	19
ROUTE HYDROGRAPH TO	21
COMBINE 2 HYDROGRAPHS AT	21
RUNOFF HYDROGRAPH AT	20
ROUTE HYDROGRAPH TO	20
ROUTE HYDROGRAPH TO	21
COMBINE 2 HYDROGRAPHS AT	21
RUNOFF HYDROGRAPH AT	21
COMBINE 2 HYDROGRAPHS AT	21
ROUTE HYDROGRAPH TO	22
RUNOFF HYDROGRAPH AT	22
COMBINE 2 HYDROGRAPHS AT	22
ROUTE HYDROGRAPH TO	22
ROUTE HYDROGRAPH TO	26
RUNOFF HYDROGRAPH AT	23
ROUTE HYDROGRAPH TO	23
ROUTE HYDROGRAPH TO	25
RUNOFF HYDROGRAPH AT	24
ROUTE HYDROGRAPH TO	24
ROUTE HYDROGRAPH TO	25
COMBINE 2 HYDROGRAPHS AT	25
RUNOFF HYDROGRAPH AT	25
COMBINE 2 HYDROGRAPHS AT	25
RUNOFF HYDROGRAPH AT	25
COMBINE 2 HYDROGRAPHS AT	25
ROUTE HYDROGRAPH TO	26
COMBINE 2 HYDROGRAPHS AT	26
ROUTE HYDROGRAPH TO	28
RUNOFF HYDROGRAPH AT	27
ROUTE HYDROGRAPH TO	28
COMBINE 2 HYDROGRAPHS AT	28
RUNOFF HYDROGRAPH AT	29
ROUTE HYDROGRAPH TO	30
RUNOFF HYDROGRAPH AT	30
COMBINE 2 HYDROGRAPHS AT	30
ROUTE HYDROGRAPH TO	31
RUNOFF HYDROGRAPH AT	31
COMBINE 2 HYDROGRAPHS AT	31
RUNOFF HYDROGRAPH AT	31
COMBINE 2 HYDROGRAPHS AT	31
RUNOFF HYDROGRAPH AT	31
COMBINE 2 HYDROGRAPHS AT	31
RUNOFF HYDROGRAPH AT	31
COMBINE 2 HYDROGRAPHS AT	31
ROUTE HYDROGRAPH TO	31
ROUTE HYDROGRAPH TO	32
RUNOFF HYDROGRAPH AT	32
COMBINE 2 HYDROGRAPHS AT	32
ROUTE HYDROGRAPH TO	28
COMBINE 2 HYDROGRAPHS AT	28
RUNOFF HYDROGRAPH AT	28
COMBINE 2 HYDROGRAPHS AT	28
ROUTE HYDROGRAPH TO	33
END OF NETWORK	

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DRAIN SAFETY VERSION JULY 1970
 LAST MODIFICATION 26 FEB 79

RUN DATED 79/06/27.
 TIMED 13.35.35.

OSHEGO RIVER BASIN
HEC100
PWF- OVERFLOW ANALYSIS

JOB SPECIFICATION

NO	IDR	IRIN	IDAT	IRH	IRIN	NETC	IPLT	IPRT	ISTAN
40	6	0	0	0	0	0	0	4	0
JOPER									
HUT									
LROPT									
TRACE									
5 0 0 0									

MULTI-PLAN ANALYSES TO BE PERFORMED

AMPLAN= 1 RTIO= 6 LRTIO= 1

RTIOS= .20 .40 .50 .60 .80 1.00

SUB-AREA RUNOFF COMPUTATION

1 BARGE CANAL LOCK 30 AT RACEDON (SUB AREA A1)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	IUNG	TAREA	SNIP	TRSDA	TRSPC	RATIO	ISHOU	ISARE	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

HYDROGRAPH ROUTING

2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IRIS	ISARE	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTDL	LAG	WVSIX	I	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

3 GAMBACIA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	IUNG	TAREA	SNIP	TRSDA	TRSPC	RATIO	ISHOU	ISARE	LOCAL
1	-1	147.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

*** **

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LOSSPT STROR BLTOR RTIOI ERBIN STRBS RTIOK STRIL CHSTL ALSRI RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .05 0.00 0.00

RECESSION DATA
 STRTO= 140.00 GRCSO= 550.00 RTIOR= 1.60

END-OF-PERIOD FLOW
 NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q
 SUM 14.64 11.56 3.30 184787.
 (377.1) (294.1) (84.1) (5281.22)

COMBINE HYDROGRAPHS

4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 2 2 0 0 0 0 1 0 0

HYDROGRAPH ROUTING

5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 6 1 0 0 0 0 1 0 0

ROUTING DATA

GLOSS CLOSS HVC IRES ISAME IOP1 IPOP LSTR
 0.0 0.000 0.00 0 1 0 0
 HSTPS HSTOL LAG ARESK 1 TSK STORA ISPRAT
 0 0 3 0.000 0.000 0.000 0. 0

SUB-AREA RUMOFF COMPUTATION

6 LOWER CARRAGUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)

ISTAG ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 6 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INTDC IUNG TAREA SHAP TRSDA TRSPC RATIO ISHOW ISAME LOCAL
 1 -1 110.00 0.00 5100.00 0.00 0.000 0 1 0

PRECIP DATA

SPFE PWS R6 R12 R24 R48 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
 LROPT STROR BLTKR RTIOL ERRAIN STRKS RTIOX STRTL CNSTL ALSRI RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .05 0.00 0.00

RECESSION DATA
 STRTO= 120.00 BRCSH= 470.00 RTIOR= 1.60

END-OF-PERIOD FLOW
 NO.DA NO.NH PERIOD RAIN ERCS LOSS CORR 0 NO.DA NO.NH PERIOD RAIN ERCS LOSS CORR 0
 SUM 14.06 11.56 3.30 147710.
 (377.11 294.11 84.11 4171.50)

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAB ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 6 2 0 0 0 0 1 0 0

SUB-AREA RUNOFF COMPUTATION

8 LOCAL FLOW E-3 (AREA LOCAL TO DARGE CANAL E-29 TO E-27)

ISTAB ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO
 3 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

INTDC IUNG TAREA SHRP TRSDA TRSPC RATIO ISHOW ISAME LOCAL
 1 -1 51.00 0.00 5100.00 0.00 0.00 0 1 0

PRECIP DATA

SPFE PHS R6 R12 R24 R40 R72 R96
 0.00 21.50 33.00 47.00 55.00 65.00 72.00 74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT STROR BLTKR RTIOL ERRAIN STRKS RTIOX STRTL CNSTL ALSRI RTIMP
 0 0.00 0.00 1.00 0.00 0.00 1.00 .50 .05 0.00 0.00

RECESSION DATA

STRTO= 100.00 BRCSH= 200.00 RTIOR= 1.60

END-OF-PERIOD FLOW
 NO.DA NO.NH PERIOD RAIN ERCS LOSS CORR 0 NO.DA NO.NH PERIOD RAIN ERCS LOSS CORR 0
 SUM 14.06 11.56 3.30 65053.
 (377.11 294.11 84.11 1042.10)

HYDROGRAPH ROUTING

9 ROUTED FLOW E-3 TO LYONS (NODE 6)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

BLSS	CLOSS	AVG	IBES	ISARE	IOFT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTDL	LAC	WSTXK	I	TSK	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

10 COMBINE FLOWS AT NODE 6

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

11 CANADAIGUA LAKE INFLOW

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISARE	LOCAL
1	-1	104.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STOKR	DLTKR	RTIAL	ERAIN	STOKS	RTION	STRTL	CHSTL	ALSAI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.25	.03	0.00	0.00

RECESSION DATA

STRTO= 300.00 QRESN= 1000.00 RTION= 1.60

END-OF-PERIOD FLOW

NO.DA	NO.HH	PERIOD	RAIN	EQCS	LOSS	COMP Q	NO.DA	NO.HH	PERIOD	RAIN	EQCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.06 12.00 2.04 252491.
1 277.11 305.11 73.11 7152.41

HYDROGRAPH ROUTING

12 CANADAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

	GLDSS	CLOSS	AVG	IRIS	ISAME	TOPT	IPMP	LSTR		
	0.0	0.000	0.00	1	1	0	0	0		
			HSTPS	HSTDL	LAC	ANSHX	I	TSK	STORA	ISPRAT
			0	0	0	0.000	0.000	0.000	51000.	0
STORAGE	10700.00	21300.00	31900.00	42500.00	53100.00	63700.00	74300.00	84900.00	95500.00	106100.00
	212500.00	319000.00								
OUTFLOW	50.00	50.00	50.00	50.00	200.00	600.00	1000.00	1560.00	2250.00	3000.00
	63000.00	200344.00								

HYDROGRAPH ROUTING

13 ROUTED OUTFLOW TO FLINT CREEK MOUTH

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0
ROUTING DATA								
GLDSS	CLOSS	AVG	IRIS	ISAME	TOPT	IPMP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
HSTPS	HSTDL	LAC	ANSHX	I	TSK	STORA	ISPRAT	
0	12	5	0.000	0.000	0.000	0.	0	

N P *** 025(2250210 * ** Pn 7001200000 * 0.2000000 * 10 * 10210.1110 P 1 1020000000

SUB-AREA RUNOFF COMPUTATION

14 FLINT CREEK INFLOW A-2

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO	
5	0	0	0	0	0	1	0	0	
HYDROGRAPH DATA									
INTDC	ITUNG	TAREA	SBAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	102.00	0.00	5100.00	0.00	0.000	0	1	0
PRECIP DATA									
SPFE	PRS	R6	R12	R24	R48	R72	R96		
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00		

TRSPC COMPUTED BY THE PROGRAM IS .934

LROPT	STORR	BLTRR	RTIOL	ERRAIN	STRKS	RTION	STRTL	CRSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA
 STRTD: 90.00 GRCSB: 2000.000 RTIOR: 1.60

NO.00	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.00	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.84 11.00 3.70 133487.
 (377.1) (281.1) (96.1) (3774.93)

COMBINE HYDROGRAPHS

15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

16 OUTLET ROUTED TO LOCK 27

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	1	0	0	0	0	1	0	0

ROUTING DATA								
QLOSS	CLOSS	AVG	INES	ISAME	IOPT	IPMP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	

WSTPS	WSTDL	LAC	WPSIX	I	TSK	STORA	ISPRAT	
0	7	3	0.000	0.000	0.000	0.	0	

SUB-AREA RUMOFF COMPUTATION

17 OUTLET LOCAL FLOW A-3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	ITNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	155.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PRS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STORR	ULTOR	RTIOL	ERAIN	STORR	RTIOL	STRTL	CNSTL	ALSMI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.60	.06	0.00	0.00

RECESSION DATA

STRTD= 150.00 GRCSH= 200.00 RTIOL= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP G	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP G
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.66 11.06 3.00 187176.
(377.)(281.)(97.)(53001.23)

COMBINE HYDROGRAPHS

18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27

.....

19 ROUTE OUTLET TO CANAL

		ROUTING DATA				
BLOSS	CLOSS	AVG	RES	ISAME	LOPT	LSTR
0.0	0.000	0.00	0	1	0	0

20 COMBINE FLOW AT 6 (OUTLET FLOW = E-1, E-2, E-3)

21 ROUTE FLOWS AT LOCK 27 TO MODE 8

		ROUTING DATA				
GROSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPRP
0.0	0.000	0.00	0	1	0	0

22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)

HYDROGRAPH DATA									
INTDC	TIME	TAREA	SRP	TRSDN	TRSPC	RATIO	TSRDN	TSRVE	LOCAL
1	-1	94.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA							
SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	11.00	11.00	11.00	07.00	11.00	11.00	11.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LADPT	STORR	BLTR	RTIOL	ENRIN	STRKS	RTIOL	STRTL	CHSTL	ALSHZ	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA

STRTO: 100.00 BRCSO: 360.00 RTION: 1.60

END-OF-PERIOD FLOW

NO.BA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.BA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.04 11.00 3.70 109181.
(377.11 281.11 96.11 3091.66)

HYDROGRAPH ROUTING

23 ROUTE FLOWS AT LOCK 26 TO NODE 8

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IDARE	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

BLSS	CLOSS	AVG	INES	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTOL	LAG	WPSX	I	TSX	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IDARE	ISTAGE	IAUTO
1	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

25 ROUTE FLOWS AT NODE 8 TO NODE 10

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IDARE	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

BLSS	CLOSS	AVG	INES	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTOL	LAG	WPSX	I	TSX	STORA	ISPRAT
0	5	2	0.000	0.000	0.000	0.	0

SHORT-TERM RUNOFF COMPUTATION

26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHB	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	10.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPPE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STORR	DLTKR	RTIOI	ERAIN	STORS	RTION	STRTL	CNSTL	ALSR1	RTINF
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRESN= 90.00 RTION= 1.40

END-OF-PERIOD FLOW

NO. DA	HR. IN	PERIOD	RAIN	EICS	LOSS	COMP Q	NO. DA	HR. IN	PERIOD	RAIN	EICS	LOSS	COMP Q
--------	--------	--------	------	------	------	--------	--------	--------	--------	------	------	------	--------

SUM 14.04 11.00 3.78 23275.
(377.1) (201.1) (96.1) (659.07)

HYDROGRAPH ROUTING

27 ROUTE INFLOW E-5 TO NODE 10

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

MSIPS	MSIDL	LAC	ARESH	I	TSR	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

29 ROUTE FLOWS AT NODE 10 TO NODE 15

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
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30 LOCAL INFLOW D-1 INTO KEUKA LAKE

HYDROGRAPH DATA									
INTDC	TUNG	TAREA	SNRP	TRSDA	TRSPC	RATIO	ISHDN	ISAVE	LOCAL
1	-1	183.00	0.00	5100.00	0.00	0.000	0	1	0

SPFE	PHS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

LOSS DATA

RECESSION DATA

STRTOX 100.00 GRCSX 000.00 RTION 1.60

NO. DA	HR. MIN	PERIOD	RAIN	ETCS	LOSS	COMP. G	NO. DA	HR. MIN	PERIOD	RAIN	ETCS	LOSS	COMP. G
1	10	10	10	10	10	10	1	10	10	10	10	10	10
2	20	20	20	20	20	20	2	20	20	20	20	20	20
3	30	30	30	30	30	30	3	30	30	30	30	30	30
4	40	40	40	40	40	40	4	40	40	40	40	40	40
5	50	50	50	50	50	50	5	50	50	50	50	50	50
6	60	60	60	60	60	60	6	60	60	60	60	60	60
7	70	70	70	70	70	70	7	70	70	70	70	70	70
8	80	80	80	80	80	80	8	80	80	80	80	80	80
9	90	90	90	90	90	90	9	90	90	90	90	90	90
10	100	100	100	100	100	100	10	100	100	100	100	100	100

31 KENNA LAKE OUTFLOW W/ MODIFIED PULS

CLASS		ROUTING DATA				LSTR
GLSS	CLOSS	AVG	TRES	ISAVE	TEPT	
0.0	0.000	0.00	1	1	0	0

STORAGE	107000.00 328550.00	129500.00	141000.00	153500.00	172000.00	170000.00	191000.00	204000.00	217000.00	0.00
OUTFLOW	120.00 126000.00	320.00	445.00	530.00	575.00	670.00	690.00	1170.00	1470.00	0.00

HYDROGRAPH ROUTING

32 ROUTE KEUKA LAKE OUTFLOWS TO 12

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVG	IRIS	ISARE	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTL	LAC	APSKX	I	TSK	STOR	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

33 SENECA LAKE INFLOWS 0-2

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	LONG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISARE	LOCAL
1	-1	524.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTR	RTIO	ERACH	STOKS	RTIOH	STRTL	CNSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.03	0.00	0.00

RECESSION DATA

STRTO= 500.00 BRCSH= 2000.00 RTIOH= 1.60

END-OF-PERIOD FLOW

NO. DA	HR. MIN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO. DA	HR. MIN	PERIOD	RAIN	EXCS	LOSS	COMP 0
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SUM 14.06 12.52 2.34 7411.90.
(377.11 310.11 59.11 21007.99)

COMBINE HYDROGRAPHS

34 COMBINE LOCAL FLOW 0-2 AND ROUTED KEUKA LAKE OUTLET FLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
12	2	0	0	0	0	1	0	0

35 SENECA LAKE OUTFLOWS - MODIFIED PULS METHOD

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
	12	1	0	0	0	0	1	0	0

ROUTING DATA

	GLOSS	CLOSS	AVG	IRCS	ISARE	IOPT	IPWP	LSTR
	0.0	0.000	0.00	1	1	0	0	0

	WSTPS	WSTBL	LAC	AVSKX	X	TSK	STORA	ISPRAT
	0	0	0	0.000	0.000	0.000	534000.	0

STORAGE	372000.00	414000.00	454000.00	500000.00	543000.00	584000.00	630000.00	650000.00	674000.00	720000.00
	000000.00	120000.00								

OUTFLOW	700.00	700.00	700.00	700.00	700.00	700.00	700.00	1000.00	3000.00	3000.00
	15000.00	77000.00								

HYDROGRAPH ROUTING

36 SENECA LAKE OUTFLOWS ROUTED TO 13

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
	13	1	0	0	0	0	1	0	0

ROUTING DATA

	GLOSS	CLOSS	AVG	IRCS	ISARE	IOPT	IPWP	LSTR
	0.0	0.000	0.00	0	1	0	0	0

	WSTPS	WSTBL	LAC	AVSKX	X	TSK	STORA	ISPRAT
	0	2	0	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

37 LOCAL INFLOW 0-4

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
	13	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHDN	ISARE	LOCAL
1	-1	29.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPYE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STBR	BLTR	RTOL	EMAIN	STROK	RTION	STRTL	CHSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTD= 92.00 ORCSH= 200.00 RTION= 1.40

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0
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SUM 14.86 11.56 3.30 51530.
(377.11 294.11 84.11 1459.17)

COMBINE HYDROGRAPHS

30 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW 8-4

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
13	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

29 ROUTE HYDROGRAPH TO 14 (CATUGA LAKE INFLOW)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IBES	ISARE	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTL	LAG	APSRX	1	TSX	STORA	ISPHAT
0	6	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

40 LOCAL INFLOW 8-5

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHYD	INHC	TAREA	SNAP	TRSDA	TRSPC	RATIO	IBROW	ISARE	LOCAL
1	-1	24.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PRS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LAOPT	STORL	BLTR	RTION	ERAIN	STORL	RTION	STRTL	CHSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.30	.05	0.00	0.00

RECESSION DATA

STRTD= 92.00 GRESH= 200.00 RTION= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.86 11.56 3.30 47972.
(377.11 294.11 84.11 1356.42)

COMBINE HYDROGRAPHS

41 COMBINE FLOW B-5 WITH ROUTED FLOW

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	2	0	0	0	0	1	0	0

SUB-AREA RUMOFF COMPUTATION

42 CATUCA LAKE INFLOW B-3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNC	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	782.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LRPT	STKX	DLTKR	RTOL	ERAIN	STOKS	RTION	STRTL	CNSTL	ALSAI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.03	0.00	0.00

RECESSION DATA

STRTO= 1000.00 BRCSH= 1700.00 RTION= 1.60

END-OF-PERIOD FLOW

NO.0A	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.0A	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP 0
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SUM 14.04 12.52 2.34 1001195.
(377.) (318.) (59.) (20416.03)

COMBINE HYDROGRAPHS

43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

44 CATUCA LAKE OUTFLOW - MODIFIED PULS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

		ROUTING DATA								
		GROSS	CLOSS	AVG	IPES	ISAME	IOPT	IPWP	LSTR	
		0.0	0.000	0.00	1	1	0	0	0	
				HSTPS	HSTBL	LAG	APSKX	1	TSK	STORA
				0	0	0	0.000	0.000	0.000	490000.
STORAGE	375000.00 854500.00	417000.00 962000.00	440000.00	503000.00	544000.00	587500.00	634000.00	660000.00	727000.00	0.00
OUTFLOW	1700.00 30310.00	1700.00 183500.00	1700.00	1700.00	3400.00	3400.00	3400.00	8700.00	8700.00	0.00

HYDROGRAPH ROUTING

45 ROUTE CATUGA LAKE OUTFLOWS TO NODE 15

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
15	1	0	0	0	0	1	0	0
ROUTING DATA								
GROSS	CLOSS	AVG	IPES	ISAME	IOPT	IPWP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
HSTPS	HSTBL	LAG	APSKX	1	TSK	STORA	ISPRAT	
0	3	1	0.000	0.000	0.000	0.	0	

COMBINE HYDROGRAPHS

46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
15	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

47 ROUTE FLOWS TO NODE 18

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0
ROUTING DATA								
GROSS	CLOSS	AVG	IPES	ISAME	IOPT	IPWP	LSTR	
0.0	0.000	0.00	0	1	0	0	0	
HSTPS	HSTBL	LAG	APSKX	1	TSK	STORA	ISPRAT	
0	0	3	0.000	0.000	0.000	0.	0	

SUB-AREA RUNOFF COMPUTATION

48 LOCAL FLOW E-6

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	191.00	0.00	3100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STOKS	RTION	STRTL	CNSTL	ALSN1	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 140.00 GRCSN= 400.00 RTION= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.86 11.00 3.70 227590.
(377.11 281.11 96.11 6444.63)

HYDROGRAPH ROUTING

49 ROUTE LOCAL FLOW E-6 TO NODE 18

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

GLSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTL	LAC	ARSKK	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0

COMBINE HYDROGRAPHS

50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

SUB-AREA RUMOFF COMPUTATION

51 HEAD BASIN INFLOW C-1

ISTAG	ICORP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
17	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTUC	INTUC	INTUC	INTUC	INTUC	INTUC	INTUC	INTUC	INTUC	INTUC	INTUC
1	-1	201.00	0.00	5100.00	0.00	0.00	0	1	0	

PRECIP DATA

SPFE	PVS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STOR	DLTKR	RTOL	ERRIN	STKS	RTOK	STRL	CHSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTO= 450.00 GRCSH= 1000.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP	NO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP
-------	-------	--------	------	------	------	------	-------	-------	--------	------	------	------	------

SUM 14.66 11.46 3.39 264813.
(377.11 291.11 86.11 7496.67)

HYDROGRAPH ROUTING

S2 QUASCO LAKE INFLOWS - MODIFIED PULS METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
17	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	1	1	0	0	0

WSTPS	WSTOL	LAG	AVSCK	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	92000.

STORAGE	66000.00	73200.00	79900.00	86500.00	93200.00	99000.00	104500.00	113200.00	119000.00	124500.00
	152900.00	205700.00								

OUTFLOW	600.00	600.00	600.00	1100.00	1700.00	2300.00	2840.00	3400.00	3400.00	3400.00
	24000.00	69100.00								

HYDROGRAPH ROUTING

S3 ROUTE QUASCO LAKE OUTLET FLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTOL	LAG	AVSCK	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.

COMBINE HYDROGRAPHS

54 COMBINE FLOWS WITH FLOWS AT NODE 18

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

55 READ LOCAL FLOW C-6

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	19.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PWS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LDOP	STOR	BLTR	RTOL	ERAIN	STOR	RTON	STRL	CHSTL	ALSH	RTMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 90.00 GRCSO= 200.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.86 11.00 3.78 2504.8.
(377.3) (281.3) (96.3) (710.41)

COMBINE HYDROGRAPHS

56 COMBINE LOCAL FLOW C-6 WITH FLOW AT NODE 18

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

57 ROUTE FLOW AT 18 TO NODE 21

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NOPTS	NOIUL	LNW	NOISAA	A	IDA	STURH	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

50 LOCAL INFLOW E-7

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
19	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	90.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	BLTKR	RTIOL	ERRAIN	STRKS	RTIOK	STRTL	CNSTL	ALSNL	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00 GRCSN= 400.00 RTIOK= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP	0	NO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP	0
-------	-------	--------	------	------	------	------	---	-------	-------	--------	------	------	------	------	---

SUM 14.04 11.00 3.70 122486.
(377.)(281.)(96.)(3468.42)

HYDROGRAPH ROUTING

59 ROUTE LOCAL FLOW TO NODE Z1

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	1	0	0	0	0	1	0	0

ROUTING DATA

GLSS	CLSS	AVC	IRES	ISAME	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NOPTS	NOIUL	LNW	NOISAA	A	IDA	STURH	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

60 COMBINE ROUTED FLOW WITH FLOW AT Z1

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

61 SKANEATELES LAKE INFLOWS

ISTAG	ICOMP	IECON	ITAPE	JFLT	JPR1	INAME	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INYDC	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISARE	LOCAL
1	1	74.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PRS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LRPT	STRKR	DLTKR	RTOL	ERRIN	STOKS	RTOK	STRTL	CMSTL	ALSAI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRYD= 250.00 GRCSN= 500.00 RTIOR= 1.60

END-OF-PERIOD FLOW

2000-01 PERIOD: FEB						2000-01 PERIOD: FEB													
NO.	DA	HR.	MIN	PERIOD	RAIN	EICS	LOSS	COMP	Q	NO.	DA	HR.	MIN	PERIOD	RAIN	EICS	LOSS	COMP	Q

SUM 14.86 11.46 3.39 100.49,
(377.)(291.)(86.)(2847.23)

HYDROGRAPH ROUTING

62 SHANEATELES LAKE OUTFLOWS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

BLISS	CLOSS	AVG	IRIS	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	1	1	0	0	0

WSTPS	WSTDL	LAG	APRSHX	I	TSR	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	0	0

STORAGE	0.00	17323.00	34756.00	52184.00	104368.00	208736.00	243492.00
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OUTFLOW	0.00	353.00	747.00	1508.00	6403.00	13313.00	17359.00
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HYDROGRAPH ROUTING

6.3 ROUTE SHANEATELES LAKE OUTFLOWS TO NODE 21

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRY	INARE	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTINE DATA

BLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPW	LSTR
-------	-------	-----	------	-------	------	-----	------

INSTPS	INSTDL	LAG	AMSKX	I	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE Z1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

65 LOCAL FLOW C-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISARE	LOCAL
1	-1	27.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTOL	ERRIN	STRKS	RTION	STRTL	CNSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 90.00 BRCSH= 200.00 RTION= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.86 11.08 3.78 35564.
(377.3) (281.3) (96.3) (1007.12)

COMBINE HYDROGRAPHS

66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE Z1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

67 ROUTING TO NODE 22

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

INSTPS	INSTL	LAG	AVSXX	I	TSK	STORA	ISPRAT
0	4	1	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

68 LOCAL FLOW E-0

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	90.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PWS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRTK	DLTKR	RTIO	ERAIN	STNKS	RTION	STRTL	CHSTL	ALSK1	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTOH= 120.00 GRCSH= 400.00 RTION= 1.60

0

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.06 11.00 3.70 122095.
(377.11 281.11 96.11 3457.35)

COMBINE HYDROGRAPHS

69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
22	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

70 BALDWINVILLE POOL - MODIFIED PULS METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
-------	-------	-------	-------	------	------	-------	--------	-------

	QLOSS	CLOSS	AVG	IRIS	ISARE	IOPT	IPMP	LSTR
	0.0	0.000	0.00	1	1	0	0	0

	HSTPS	HSTBL	LAG	AMSKX	I	TSK	STORA	ISPRAT
	0	0	0	0.000	0.000	0.000	3250.	0

	STORAGE	3250.00	5000.00	8000.00	10000.00	11700.00	14000.00	17000.00	20000.00	24000.00	30000.00
OUTFLOW	3000.00	4000.00	6000.00	8000.00	10000.00	12000.00	14000.00	15300.00	16600.00	17000.00	

HYDROGRAPH ROUTING

71 ROUTE FLOW TO NODE 26

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	1	0	0	0	0	1	0	0

QLOSS	CLOSS	AVG	IRIS	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSTPS	HSTBL	LAG	AMSKX	I	TSK	STORA	ISPRAT
0	4	1	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

72 INFLOW TO OTISCO LAKE C-3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
23	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

HYDC	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISARE	LOCAL
1	-1	42.70	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PRS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTOL	EMBIN	STOKS	RTION	STRTL	CHSTL	ALSMI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTO= 90.00 GRCSH= 300.00 RTION= 1.60

0
END-OF-PERIOD FLOW
NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP 0 NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP 0

SUM 14.06 11.46 3.39 57820.
(377.11 291.11 84.11 1637.51)

HYDROGRAPH ROUTING

73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	23	1	0	0	0	0	1	0	0

ROUTING DATA							
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPRP	LSTR
0.0	0.000	0.00	1	1	0	0	0

	WSTPS	WSTD	LAG	AMSX	1	TSK	STOR	ISPRAT
	0	0	0	0.000	0.000	0.000	29300.	0

	STORAGE	19600.00	21000.00	23900.00	26100.00	28300.00	30500.00	32600.00	34800.00	37000.00	39200.00
	45700.00	52300.00	58000.00	63300.00							

	OUTFLOW	200.00	200.00	200.00	200.00	200.00	400.00	900.00	1600.00	2000.00	2000.00
	7040.00	10100.00	33700.00	53200.00							

HYDROGRAPH ROUTING

74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	25	1	0	0	0	0	1	0	0

ROUTING DATA							
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

	WSTPS	WSTD	LAG	AMSX	1	TSK	STOR	ISPRAT
	0	10	4	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

75 INFLOW INTO OROONAGA RESERVOIR C-4

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	24	0	0	0	0	0	1	0	0

HYDROGRAPH DATA									
INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	60.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA							
SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA										
LIQPT	STRID	DLTKR	RTIOL	ERRAIN	STRKS	RTIOW	STRTL	CMSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.04	0.00	0.00

RECESSION DATA		
STRTO	WCSH	RTIOW
250.00	300.00	1.60

END-OF-PERIOD FLOW															
NO.00	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP	0	NO.00	HR.00	PERIOD	RAIN	EXCS	LOSS	COMP	0

SUR 14.86 10.60 4.26 83772.
 (377.16 269.16 100.16 2372.16)

HYDROGRAPH ROUTING

76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	24	1	0	0	0	0	1	0	0
ROUTING DATA									
	BLOSS	CLOSS	AVG	IRIS	ISAME	IOFT	IPWP	LSTR	
	0.0	0.000	0.00	1	1	0	0	0	
	WSTPS	WSTDL	LAG	APSKX	I	TSK	STORA	ISPRAT	
	0	0	0	0.000	0.000	0.000	0.	0	
STORAGE	0.00	100.00	700.00	1900.00	3500.00	7940.00	18200.00	22200.00	27000.00
	43400.00	52300.00	62200.00	72100.00					
OUTFLOW	00.00	430.00	660.00	880.00	1070.00	1420.00	1770.00	1840.00	2000.00
	6200.00	15400.00	20400.00	44700.00					

HYDROGRAPH ROUTING

77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	25	1	0	0	0	0	1	0	0
ROUTING DATA									
	BLOSS	CLOSS	AVG	IRIS	ISAME	IOFT	IPWP	LSTR	
	0.0	0.000	0.00	0	1	0	0	0	
	WSTPS	WSTDL	LAG	APSKX	I	TSK	STORA	ISPRAT	
	0	0	3	0.000	0.000	0.000	0.	0	

COMBINE HYDROGRAPHS

78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	25	2	0	0	0	0	1	0	0

SUB-AREA RIBOFF COMPUTATION

79 LOCAL INFLOW C-5

	ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
	25	0	0	0	0	0	1	0	0


```

HYDROGRAPH DATA
INHYC  IUNG  TAREA  SNAP  TRSDA  TRSPC  RATIO  ISHOW  ISAME  LOCAL
1      -1  102.00  0.00  5100.00  0.00  0.000  0      1      0

PRECIP DATA
SPFE  PMS  R6  R12  R24  R48  R72  R96
0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
LROPT  STRKR  BLTKR  RTIOL  ERRAIN  STRKS  RTION  STRTL  CNSTL  ALSH1  RTIMP
0      0.00  0.00  1.00  0.00  0.00  1.00  1.25  .06  0.00  0.00

RECESSION DATA
STRTO= 250.00  BRCSH= 500.00  RTION= 1.60

END-OF-PERIOD FLOW
NO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q  NO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q
SUM 14.86 10.77 4.00 126945.
( 377.11 274.11 104.11 3594.60)

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COMBINE HYDROGRAPHS

00 COMBINE ROUTED FLOWS+ LOCAL INFLOW

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ISTAG  ICOMP  IECON  ITAPE  JPLT  JPRT  INAME  ISTAGE  IAUO
25     2      0      0      0      0      1      0      0

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*****
*****
*****
*****
*****

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SUB-AREA RUNOFF COMPUTATION

01 LOCAL FLOW C-8

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ISTAG  ICOMP  IECON  ITAPE  JPLT  JPRT  INAME  ISTAGE  IAUO
25     0      0      0      0      0      1      0      0

```

```

HYDROGRAPH DATA
INHYC  IUNG  TAREA  SNAP  TRSDA  TRSPC  RATIO  ISHOW  ISAME  LOCAL
1      -1  72.00  0.00  5100.00  0.00  0.000  0      1      0

PRECIP DATA
SPFE  PMS  R6  R12  R24  R48  R72  R96
0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA
LROPT  STRKR  BLTKR  RTIOL  ERRAIN  STRKS  RTION  STRTL  CNSTL  ALSH1  RTIMP
0      0.00  0.00  1.00  0.00  0.00  1.00  1.00  .06  0.00  0.00

RECESSION DATA
STRTO= 250.00  BRCSH= 300.00  RTION= 1.60

END-OF-PERIOD FLOW
NO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q  NO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS  COMP Q

```

SUB 14.00 10.74 3.72 71.00
 (377.1) (276.1) (100.1) (2567.68)

COMBINE HYDROGRAPHS

02 COMBINE LOCAL FLOW AT NODE 25

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

03 ROUTE FLOWS TO NODE 26

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IRIS	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTBL	LAG	APSKX	I	TSK	STORA	ISPRAT
0	0	3	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

04 COMBINE ROUTED FLOW AND FLOW AT NODE 26

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

05 ROUTE FLOWS TO NODE 28 (THREE RIVERS)

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IRIS	ISARE	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSTPS	NSTBL	LAG	APSKX	I	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

06 LOCAL FLOW (E-9) AT NODE 27

ISTAG	ICOMP	IECON	ITAPE	JPL1	JPR1	INAME	ISTAGE	IAUTO
27	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTDC	ITUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	37.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.20	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTR	RTIOI	ERAIN	STRKS	RTION	STRTL	CNSTL	ALSMI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.04	0.00	0.00

RECESSION DATA

STRTO= 100.00 QRCSD= 150.00 RTIOR= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.HH	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.HH	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.86 11.08 3.78 46874.
(377.11 281.11 96.11 1327.32)

HYDROGRAPH ROUTING

07 ROUTE LOCAL FLOW E-9 TO NODE 28

ISTAG	ICOMP	IECON	ITAPE	JPL1	JPR1	INAME	ISTAGE	IAUTO
28	1	0	0	0	1	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IMES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTDL	LAC	AWSKK	I	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 28+ PLAN 1+ RTIO 1

OUTFLOW

19.	19.	18.	17.	17.	37.	148.	235.	280.	528.
1549.	2110.	1984.	996.	473.	259.	173.	74.	37.	28.
27.	26.	25.	24.	22.	21.	20.	20.	19.	18.
17.	16.	15.	15.	14.	13.	13.	12.	12.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2110.	2048.	1602.	734.	9368.
CMS	60.	58.	45.	21.	265.
INCHES		.51	1.61	2.22	2.34
MM		13.00	40.91	56.20	59.82
AC-FT		1015.	3177.	4370.	4445.
THOUS CU H		1253.	3919.	5390.	5730.

STATION 28+ PLAN 1+ RTIO 2

OUTFLOW

30.	30.	34.	35.	33.	75.	337.	470.	559.	1054.
-----	-----	-----	-----	-----	-----	------	------	------	-------

3070.	4221.	3971.	1993.	948.	318.	348.	148.	74.	37.
54.	52.	49.	47.	45.	43.	41.	39.	37.	36.
34.	32.	31.	29.	28.	27.	26.	24.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4221.	4096.	3283.	1469.	18736.
CMS	120.	116.	91.	42.	531.
INCHES		1.03	3.22	4.43	4.71
MM		26.16	81.83	112.55	119.65
AC-FT		2031.	6354.	8740.	9291.
THOUS CU H		2585.	7837.	10760.	11460.

STATION 28+ PLAN 1, RTIO 3

OUTFLOW									
40.	47.	46.	43.	41.	93.	421.	568.	699.	1320.
3072.	5276.	4964.	2491.	1182.	647.	432.	185.	92.	71.
60.	65.	62.	59.	56.	54.	51.	49.	47.	44.
42.	40.	39.	37.	35.	33.	32.	30.	29.	28.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5276.	5120.	4004.	1836.	23420.
CMS	149.	145.	113.	52.	663.
INCHES		1.29	4.03	5.54	5.89
MM		32.69	102.28	140.69	149.56
AC-FT		2539.	7942.	10925.	11613.
THOUS CU H		3131.	9797.	13475.	14325.

STATION 28+ PLAN 1, RTIO 4

OUTFLOW									
57.	54.	55.	52.	50.	112.	505.	705.	839.	1584.
4646.	6331.	5957.	2909.	1419.	777.	519.	222.	111.	85.
81.	70.	74.	71.	67.	64.	61.	59.	56.	53.
51.	48.	46.	44.	42.	40.	38.	37.	35.	34.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6331.	6144.	4805.	2203.	28105.
CMS	179.	174.	136.	62.	796.
INCHES		1.54	4.03	6.65	7.07
MM		39.23	122.74	168.83	179.47
AC-FT		3046.	9531.	13109.	13936.
THOUS CU H		3750.	11756.	16170.	17190.

STATION 28+ PLAN 1, RTIO 5

OUTFLOW									
76.	75.	73.	70.	66.	149.	674.	940.	1110.	2112.
6195.	8441.	7942.	3906.	1891.	1036.	692.	296.	148.	114.
100.	103.	99.	94.	90.	86.	82.	78.	74.	71.
60.	65.	62.	59.	56.	54.	51.	49.	47.	45.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8441.	8192.	6407.	2937.	37473.
CMS	239.	232.	181.	83.	1041.
INCHES		2.06	6.44	8.86	9.42
MM		52.31	163.65	225.10	239.30
AC-FT		4062.	12700.	17479.	18982.
THOUS CU H		5010.	15675.	21560.	22920.

STATION ZB, PLAN 1, RT10 6

OUTFLOW

95.	94.	91.	87.	83.	187.	842.	1175.	1398.	2640.
7744.	10551.	9920.	9982.	2364.	1295.	864.	370.	184.	142.
136.	129.	123.	118.	112.	107.	102.	98.	93.	89.
85.	81.	77.	74.	70.	67.	64.	61.	58.	56.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10551.	10240.	8009.	3672.	46841.
CMS	299.	290.	227.	104.	1326.
INCHES		2.57	8.05	11.00	11.78
MM		65.39	204.57	281.38	299.12
AC-FT		5077.	15885.	21849.	23227.
THOUS CU N		6263.	19594.	26958.	28450.

COMBINE HYDROGRAPHS

80 COMBINE HYDROGRAPHS AT ZB

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IRAME	ISTAGE	IAUTO
ZB	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN (C-Z)

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IRAME	ISTAGE	IAUTO
Z9	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	ITUNG	TAREA	SAMP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

HYDROGRAPH ROUTING

90 ROUTE FLOW AT NODE Z9 TO NODE ZB

ISTAB	ICOMP	IECON	ITAPE	JPLT	JPRT	IRAME	ISTAGE	IAUTO
ZB	1	0	0	0	0	1	0	0

ROUTING DATA

OLDS	CLOSS	AVG	IRDS	ISARE	IOPT	IPRP	LSTR
0.0	0.000	0.00	0	1	0	0	0

HSPTS	HSDB	LAG	APSRN	X	TSK	STOR	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

91 LOCAL INFLOW D-4

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	529.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STORR	DLTKR	RTOL	ERAIN	STOKS	RTION	STRTL	CNSTL	ALSKI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTO= 000.00 BRCSH= 3960.00 RTION= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MM	PERIOD	RAIN	EICS	LOSS	COMP 0	NO.DA	HR.MM	PERIOD	RAIN	EICS	LOSS	COMP 0
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 14.86 11.00 3.78 681577.
(377.)(281.)(96.)(19309.11)

COMBINE HYDROGRAPHS

92 COMBINE LOCAL FLOW WITH ROUTED FLOW

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

93 ROUTE FLOWS TO NODE 31

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	1	0	0	0	0	1	0	0

ROUTING DATA							
QLOSS	CLOSS	AWC	RES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTDL	LAC	APSAK	Z	TSK	STORA	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

94 LOCAL FLOW D-3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	144.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STKR	DLTKR	RTOL	ERAIN	STKRS	RTIOK	STRTL	CNSTL	ALSRI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTO= 320.00 GRCSH= 1000.00 RTIOR= 2.00

END-OF-PERIOD FLOW

NO.DA	HR.HH	PERIOD	RAIN	EICS	LOSS	COMP	NO.DA	HR.HH	PERIOD	RAIN	EICS	LOSS	COMP
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SUM 14.06 11.08 3.78 176726.
(377.1) (281.1) (96.1) (5004.32)

COMBINE HYDROGRAPHS

95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

96 LOCAL FLOW D-2

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	105.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R4	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STKR	DLTKR	RTOL	ERAIN	STKRS	RTIOK	STRTL	CNSTL	ALSRI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTO= 240.00 GRCSH= 000.00 RTIOR= 1.00

END-OF-PERIOD FLOW

NO.	DA	HR.	PERIOD	RAIN	EXCS	LOSS	COMP	Q	NO.	DA	HR.	PERIOD	RAIN	EXCS	LOSS	COMP	Q
-----	----	-----	--------	------	------	------	------	---	-----	----	-----	--------	------	------	------	------	---

SUM 14.86 11.00 3.78 136512.
(377.) (281.) (96.) (3865.59)

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COMBINE HYDROGRAPHS

97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

SUB-AREA RUNOFF COMPUTATION

98 LOCAL FLOW D-1

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	INIC	TAREA	SNAP	TRESA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	-1	200.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PRS	R6	R12	R24	R48	R72	R96
0.00	21.58	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STOKS	RTIOW	STRTL	CNSTL	ALSMI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTO= 600.00 GRCSH= 2160.00 RTIOW= 1.60

END-OF-PERIOD FLOW

NO.	DA	HR.	PERIOD	RAIN	EXCS	LOSS	COMP	Q	NO.	DA	HR.	PERIOD	RAIN	EXCS	LOSS	COMP	Q
-----	----	-----	--------	------	------	------	------	---	-----	----	-----	--------	------	------	------	------	---

SUM 14.86 11.00 3.78 361788.
(377.) (281.) (96.) (10244.70)

000000000 000000000 000000000 000000000 000000000

COMBINE HYDROGRAPHS

99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

000000000 000000000 000000000 000000000 000000000

SUB-AREA RUNOFF COMPUTATION

SUB-AREA RAINFALL COMPUTATION

100 LOCAL FLOW D-5

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPR1	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INTG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAVE	LOCAL
1	-1	249.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.05	0.00	0.00

RECESSION DATA

STRTO= 540.00 BRCSH= 2000.00 RTIOK= 1.60

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EICS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUN 14.86 11.56 3.30 363523.
(377.) (294.) (84.) (10293.83)

COMBINE HYDROGRAPHS

101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPR1	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPR1	INAME	ISTAGE	IAUTO
31	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

WSTPS	WSTDL	LAG	APSKX	I	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	670000.	0

STORAGE	442000.00	635000.00	640000.00	650000.00	680000.00	735000.00	804000.00	845000.00	0.00	0.00
	990000.00	1150000.00	1304000.00							
OUTFLOW	1000.00	1000.00	2000.00	4000.00	6000.00	8000.00	10000.00	11000.00	0.00	0.00
	27000.00	64700.00	116600.00							

HYDROGRAPH ROUTING

103 ROUTE FLOWS TO NODE 32

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRI	INAME	ISTAGE	IAUTO
32	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRIS	ISARE	LOPT	IPMP	LSTR
0.0	0.000	0.00	0	1	0	0	0

NSIPS	NSDL	LAG	AMSKX	I	TSK	STORA	ISPRAT
0	1	0	0.000	0.000	0.000	0.	0

SUB-AREA RUNOFF COMPUTATION

104 LOCAL FLOW D-4

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRI	INAME	ISTAGE	IAUTO
32	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHYD	IUNG	YAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISARE	LOCAL
1	-1	20.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STNCR	DLTKR	RTOL	ERAIN	STNKS	RTION	STRTL	CNSTL	ALSMI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTO= 70.00 GRESH= 210.00 RTDR= 1.60

END-OF-PERIOD FLOW

NO.DA	HR.MM	PERIOD	RAIN	EICS	LOSS	COMP Q	NO.DA	HR.MM	PERIOD	RAIN	EICS	LOSS	COMP Q
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SUM 14.86 11.00 3.78 36884.
(377.11 281.11 96.11 1044.44)

COMBINE HYDROGRAPHS

105 COMBINE LOCAL FLOW D-4 WITH FLOW AT 32

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRI	INAME	ISTAGE	IAUTO
32	2	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

100 ROUTE FLOW WITH SC TO NODE 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

BLOSS	CLOSS	AVG	RES	ISARE	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTBL	LAG	WPSIX	I	TSK	STORA	ISPRAT
0	4	2	0.000	0.000	0.000	0.	0

COMBINE HYDROGRAPHS

107 COMBINE ROUTED FLOW WITH FLOW AT NODE 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	2	0	0	0	0	1	0	0

SUB-AREA RUNOFF COMPUTATION

100 LOCAL FLOW 0-7

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHYG	INHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISARE	LOCAL
1	-1	110.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	77.00

TRSPC COMPUTED BY THE PROGRAM IS .924

LOSS DATA

LROPT	STRR	DLTR	RTOL	ERAIN	STNKS	RTION	STRTL	CMSTL	ALSHI	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTG= 250.00 GRCSN= 000.00 RTIOR= 2.00

END-OF-PERIOD FLOW

NO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MM	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 15.46 11.25 4.21 130583.
(393.1) (286.1) (107.1) (3924.23)

COMBINE HYDROGRAPHS

109 COMBINE WITH FLOW AT NODE 20

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	2	0	0	0	1	1	0	0

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 1									
8875.	8852.	8835.	8814.	8772.	8751.	8753.	9171.	9387.	10184.
12925.	15932.	18110.	19116.	20399.	22072.	23698.	24853.	25768.	26136.
26110.	29817.	25341.	24713.	24079.	23540.	23137.	22847.	22676.	22410.
22649.	22741.	22856.	22666.	23041.	23044.	23024.	22909.	22782.	22656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26136.	26123.	25903.	24637.	753394.
CMS	740.	740.	734.	698.	21334.
INCHES		.05	.19	.54	1.37
MM		1.28	4.77	13.61	34.70
AC-FT		12954.	51379.	146600.	373504.
THOUS CU H		15978.	63375.	188828.	448809.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 2									
9194.	9172.	9183.	9204.	9200.	9256.	9778.	10326.	10873.	12582.
18236.	24255.	28504.	30267.	32346.	35068.	37554.	39189.	40382.	40638.
40357.	39735.	38908.	37933.	37068.	36447.	36090.	35900.	35644.	35971.
36287.	36550.	36973.	37488.	37939.	38410.	38828.	39161.	39402.	39559.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40638.	40510.	40210.	38315.	1155500.
CMS	1151.	1147.	1139.	1085.	32722.
INCHES		.07	.29	.83	2.10
MM		1.87	7.41	21.17	53.22
AC-FT		28080.	79755.	227993.	573015.
THOUS CU H		24778.	98376.	281225.	706803.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 3									
9353.	9332.	9357.	9399.	9414.	9508.	10191.	10904.	11615.	13797.
20060.	28325.	33482.	35435.	37701.	40731.	42514.	45298.	46650.	46955.
46699.	46045.	45287.	44180.	43287.	42689.	42403.	42299.	42352.	42545.
42858.	43269.	43752.	44276.	44810.	45319.	45766.	46123.	46381.	46549.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46955.	46827.	46496.	44555.	1348699.
CMS	1330.	1326.	1317.	1262.	37964.
INCHES		.08	.34	.97	2.43
MM		2.16	8.57	24.62	61.74
AC-FT		23220.	92224.	265123.	664810.
THOUS CU H		28641.	113757.	327824.	828021.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 4									
9513.	9492.	9531.	9595.	9628.	9761.	10604.	11483.	12258.	15018.
23482.	32353.	38377.	40457.	42871.	46182.	49268.	51253.	52815.	53242.
53063.	52458.	51593.	50531.	49630.	49076.	48080.	46877.	46021.	45317.
49711.	50189.	50725.	51293.	51859.	52291.	52852.	53211.	53466.	53627.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53627.	53547.	53135.	51275.	1527493.
CMS	1519.	1516.	1505.	1452.	43254.
INCHES		.10	.39	1.12	2.77
MM		2.47	9.79	28.34	70.34
AC-FT		26352.	105291.	305186.	757435.
THOUS CU H		32751.	129998.	376342.	934282.

SUM OF 2 HYDROGRAPHS AT					28 PLAN 1 RTIO 5				
9831.	9813.	9879.	9985.	10058.	10267.	11430.	12640.	13863.	17443.
28600.	40290.	47974.	50270.	52909.	56966.	60770.	63310.	65400.	66295.
66360.	65040.	64971.	63000.	62025.	62263.	62134.	62211.	62450.	62020.
63301.	63060.	64490.	65164.	65034.	64460.	67021.	67451.	67750.	67951.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67951.	67054.	67360.	65143.	1904350.
CMS	1924.	1921.	1907.	1845.	53925.
INCHES		.12	.49	1.42	3.45
MM		3.12	12.41	36.00	87.70
AC-FT		33647.	133606.	387626.	944310.
THOUS CU R		41503.	164001.	478129.	1164789.

SUM OF 2 HYDROGRAPHS AT					28 PLAN 1 RTIO 6				
10150.	10133.	10220.	10376.	10407.	10774.	12257.	13819.	15410.	19894.
33060.	40171.	57454.	59943.	62941.	67609.	72185.	75346.	78170.	79405.
79709.	79270.	78374.	77004.	75992.	75392.	75293.	75420.	75715.	76152.
76710.	77360.	78102.	78805.	79603.	80444.	81114.	81640.	82016.	82255.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	82255.	82136.	81530.	79809.	2279043.
CMS	2329.	2326.	2309.	2234.	64525.
INCHES		.15	.59	1.72	4.13
MM		3.78	15.02	43.60	104.95
AC-FT		40720.	161712.	469421.	1130104.
THOUS CU R		50230.	199469.	579023.	1393963.

HYDROGRAPH ROUTING

110 ROUTE FLOW AT 28 TO NODE 33

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
33	1	0	0	0	1	1	0	0

ROUTING DATA

GLSSS	CLOSS	AVG	IRSS	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	0	1	0	0	0

WSTPS	WSTOL	LAG	WRSAX	1	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 33 PLAN 1 RTIO 1

OUTFLOW									
0075.	0060.	0054.	0034.	0007.	0779.	0025.	0950.	9171.	9501.
10032.	13014.	15656.	17719.	19200.	20529.	22054.	23541.	24770.	25503.
24002.	26021.	25756.	25291.	24711.	24111.	23505.	23175.	22007.	22713.
22640.	22649.	22749.	22854.	22954.	23024.	23043.	22999.	22905.	22824.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26021.	26012.	25004.	24505.	739529.
CMS	737.	737.	731.	696.	20941.
INCHES		.05	.19	.53	1.34

	7.20	8.75	13.75	24.00
AC-FT	12898.	51181.	146298.	366789.
THOUS CU H	15918.	63131.	188446.	452328.

STATION 33, PLAN 1, RTIO 2

OUTFLOW									
9194.	9187.	9183.	9186.	9196.	9220.	9411.	9787.	10326.	11260.
13097.	18358.	23665.	27675.	30372.	32560.	34989.	37270.	39042.	40070.
60459.	60244.	39667.	38859.	37970.	37149.	36535.	36146.	35952.	35912.
36014.	36242.	36576.	36990.	37453.	37932.	38392.	38799.	39130.	39322.
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME				
CFS	60459.	60351.	60032.	38240.	1125333.				
CMS	1146.	1143.	1134.	1083.	31866.				
INCHES		.07	.29	.83	2.04				
HR		1.86	7.37	21.13	51.82				
AC-FT	20009.	79482.	227544.	558016.					
THOUS CU H	24681.	97940.	288671.	688383.					

STATION 33, PLAN 1, RTIO 3

OUTFLOW									
9253.	9346.	9348.	9363.	9390.	9441.	9704.	10201.	10903.	12186.
15424.	20994.	27556.	32414.	35539.	37954.	40649.	43181.	45154.	46381.
46768.	46573.	45990.	45151.	44225.	43385.	42793.	42463.	42351.	42398.
62585.	62891.	63293.	63766.	64279.	64802.	65298.	65734.	66090.	66295.
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME				
CFS	46768.	46670.	46304.	44495.	1303631.				
CMS	1324.	1322.	1311.	1260.	36915.				
INCHES		.00	.34	.97	2.36				
HR		2.15	8.53	24.59	60.03				
AC-FT		23142.	91842.	264766.	646429.				
THOUS CU H		28546.	113285.	326583.	797258.				

STATION 33, PLAN 1, RTIO 4

OUTFLOW									
9513.	9506.	9512.	9529.	9585.	9661.	9998.	10616.	11482.	12953.
16953.	23618.	31404.	37062.	40568.	43170.	44187.	48901.	51112.	52437.
53040.	52921.	52372.	51528.	50585.	49745.	49195.	48944.	48929.	49075.
69253.	69739.	68208.	68736.	68292.	68047.	67367.	67018.	67176.	67381.
	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME				
CFS	53381.	53279.	52744.	50892.	1483582.				
CMS	1512.	1509.	1494.	1441.	42008.				
INCHES		.10	.38	1.11	2.69				
HR		2.45	9.72	28.12	68.32				
AC-FT		26419.	104616.	302819.	735621.				
THOUS CU H		32588.	129042.	373533.	987375.				

STATION 33, PLAN 1, RTIO 5

OUTFLOW									
9831.	9825.	9841.	9892.	9974.	10103.	10585.	11446.	12644.	14648.
19995.	28007.	38904.	46183.	50413.	53411.	56908.	60349.	63186.	65828.
66045.	66168.	65726.	64876.	63868.	62965.	62407.	62287.	62265.	62494.

06037, 03320, 03009, 04210, 03103, 03022, 00991, 00700, 07910, 07030.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67656.	67533.	66892.	64674.	1846386.
CMS	1916.	1912.	1894.	1831.	52284.
INCHES		.12	.49	1.41	3.35
MM		3.11	12.32	35.74	85.03
AC-FT		33487.	132679.	384838.	915543.
THOUS CU M		41886.	163657.	474691.	1129331.

STATION 33, PLAN 1, RTIO 6

OUTFLOW

10150.	10144.	10170.	10246.	10364.	10546.	11173.	12283.	13829.	16374.
23055.	33975.	44495.	55109.	60113.	63498.	67570.	71713.	75236.	77643.
79097.	79444.	79120.	78246.	77151.	76156.	75559.	75348.	75476.	75762.
76192.	76743.	77393.	78110.	78890.	79671.	80414.	81066.	81590.	81891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	81091.	81740.	80963.	78329.	2207121.
CMS	2319.	2315.	2293.	2218.	62499.
INCHES		.15	.59	1.70	4.00
MM		3.76	14.91	43.29	101.64
AC-FT		40532.	160587.	466088.	1094440.
THOUS CU M		49996.	190001.	574912.	1349972.

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	RATIOS APPLIED TO FLOWS					
			PLAN	RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5
				.20	.40	.50	.60	.80
								1.00
HYDROGRAPH AT	1	100.00 (259.00)	1	70.	157.	196.	235.	314.
				(2.22)	(4.44)	(5.55)	(6.66)	(8.88)
ROUTED TO	2	100.00 (259.00)	1	70.	156.	195.	234.	311.
				(2.20)	(4.41)	(5.51)	(6.61)	(8.82)
HYDROGRAPH AT	2	147.00 (380.73)	1	5716.	11432.	14291.	17149.	22865.
				(141.06)	(323.73)	(404.66)	(485.59)	(647.46)
2 COMBINED	2	247.00 (629.73)	1	5793.	11505.	14481.	17378.	23170.
				(144.03)	(328.05)	(410.07)	(492.00)	(656.11)
ROUTED TO	6	247.00 (629.73)	1	3651.	7301.	9127.	10952.	14602.
				(102.37)	(206.75)	(258.43)	(310.12)	(413.50)
HYDROGRAPH AT	6	110.00 (305.62)	1	2725.	5449.	6837.	8204.	10939.
				(77.04)	(154.08)	(193.60)	(232.32)	(309.75)
2 COMBINED	6	365.00 (945.35)	1	6222.	12444.	15555.	18666.	24888.
				(176.19)	(352.38)	(440.47)	(528.57)	(704.75)

HYDROGRAPH AT	3	51.00 (132.09)	1	3559. (100.79)	7119. (201.50)	8896. (251.97)	10678. (302.37)	14237. (403.16)	17797. (503.95)
ROUTED TO	6	51.00 (132.09)	1	1974. (55.09)	3948. (111.70)	4934. (139.73)	5921. (167.67)	7895. (223.56)	9869. (279.46)
Z COMBINED	6	416.00 (1077.44)	1	6557. (185.68)	13115. (371.36)	16793. (464.21)	19672. (557.05)	26229. (742.73)	32787. (928.41)
HYDROGRAPH AT	4	104.00 (476.56)	1	14208. (402.32)	28416. (804.65)	35528. (1005.81)	42624. (1206.97)	56832. (1609.30)	71040. (2011.62)
ROUTED TO	4	104.00 (476.56)	1	868. (24.58)	1985. (56.20)	2666. (75.48)	5119. (144.96)	11584. (328.03)	18145. (513.80)
ROUTED TO	5	104.00 (476.56)	1	828. (23.45)	1833. (51.09)	2447. (69.29)	3475. (98.40)	4907. (135.59)	10624. (300.84)
HYDROGRAPH AT	5	102.00 (264.18)	1	2638. (74.70)	5276. (149.40)	6595. (186.75)	7914. (224.11)	10552. (298.81)	13198. (373.51)
Z COMBINED	5	286.00 (740.74)	1	3060. (86.66)	6020. (170.47)	7544. (213.63)	9246. (261.82)	13808. (398.99)	18651. (528.15)
ROUTED TO	56	286.00 (740.74)	1	2577. (72.97)	5093. (144.22)	6405. (181.38)	7999. (226.50)	12497. (353.88)	17263. (488.83)
HYDROGRAPH AT	56	155.00 (401.45)	1	4049. (137.32)	9698. (274.63)	12123. (343.29)	14548. (411.95)	19397. (549.26)	24246. (686.58)
Z COMBINED	56	441.00 (1142.18)	1	7157. (202.66)	14184. (401.65)	17730. (502.07)	21420. (606.56)	29528. (836.13)	37918. (1073.71)
ROUTED TO	6	441.00 (1142.18)	1	7157. (202.66)	14184. (401.65)	17730. (502.07)	21420. (606.56)	29528. (836.13)	37918. (1073.71)
Z COMBINED	6	857.00 (2219.62)	1	13498. (382.23)	26867. (760.80)	33585. (951.01)	40445. (1145.28)	54894. (1554.43)	69626. (1971.59)
ROUTED TO	8	857.00 (2219.62)	1	11700. (331.29)	23294. (659.62)	29131. (824.91)	35158. (995.56)	46028. (1360.00)	61131. (1731.02)
HYDROGRAPH AT	7	89.00 (230.51)	1	3132. (88.69)	6264. (177.38)	7830. (221.72)	9396. (266.07)	12528. (354.76)	15660. (443.44)
ROUTED TO	8	89.00 (230.51)	1	2937. (82.16)	5873. (166.31)	7340. (207.89)	8818. (249.47)	11746. (332.62)	14683. (415.78)
Z COMBINED	8	946.00 (2450.13)	1	12296. (348.10)	24459. (692.59)	30571. (865.68)	36838. (1043.14)	50268. (1423.43)	63931. (1810.31)
ROUTED TO	10	946.00 (2450.13)	1	11829. (334.95)	23528. (666.25)	29418. (832.79)	35496. (1005.12)	46475. (1372.67)	61608. (1746.58)
HYDROGRAPH AT	9	18.00 (46.62)	1	608. (17.23)	1217. (34.45)	1521. (43.07)	1825. (51.68)	2433. (68.91)	3042. (86.13)
ROUTED TO	10	18.00 (46.62)	1	601. (17.01)	1201. (34.02)	1502. (42.52)	1802. (51.03)	2403. (68.04)	3003. (85.05)
Z COMBINED	10	946.00 (2496.75)	1	11922. (337.50)	23714. (671.51)	29642. (839.37)	35718. (1011.43)	46772. (1301.00)	62051. (1757.09)
ROUTED TO	15	946.00 (2496.75)	1	11544. (326.00)	22961. (650.10)	28782. (812.76)	34595. (979.61)	47264. (1338.43)	60158. (1703.49)

HYDROGRAPH AT	11	183.00 (473.97)	1	28364. (576.70)	40732. (1153.40)	50915. (1441.75)	61098. (1730.10)	81464. (2306.00)	101830. (2803.49)
ROUTED TO	11	183.00 (473.97)	1	560. (15.05)	839. (23.74)	1036. (29.34)	1282. (36.30)	1845. (52.23)	2406. (68.14)
ROUTED TO	12	183.00 (473.97)	1	559. (15.03)	831. (23.52)	1026. (29.05)	1263. (35.70)	1817. (51.46)	2371. (67.13)
HYDROGRAPH AT	12	524.00 (1357.15)	1	41059. (1105.31)	83710. (2370.62)	104647. (2963.20)	125577. (3555.94)	167436. (4741.25)	209295. (5926.56)
Z COMBINED	12	707.00 (1831.12)	1	42350. (1199.22)	84221. (2384.00)	105156. (2977.69)	126101. (3570.79)	167996. (4757.11)	209092. (5943.40)
ROUTED TO	12	707.00 (1831.12)	1	700. (19.02)	2514. (71.20)	3000. (84.95)	4713. (133.47)	12310. (348.62)	19824. (561.34)
ROUTED TO	13	707.00 (1831.12)	1	700. (19.02)	2500. (71.01)	3000. (84.95)	4701. (133.12)	12312. (348.65)	19707. (550.05)
HYDROGRAPH AT	13	39.00 (101.01)	1	1950. (55.44)	3915. (110.07)	4894. (138.59)	5873. (166.31)	7831. (221.75)	9709. (277.10)
Z COMBINED	13	746.00 (1932.13)	1	2650. (75.26)	4615. (130.69)	5657. (160.19)	7109. (201.31)	13847. (392.09)	21990. (622.90)
ROUTED TO	14	746.00 (1932.13)	1	1917. (54.20)	3419. (96.03)	4912. (139.09)	5982. (169.39)	13164. (372.76)	20914. (592.22)
HYDROGRAPH AT	14	36.00 (93.24)	1	1927. (54.56)	3054. (109.12)	4017. (136.40)	5780. (163.60)	7707. (210.24)	9634. (272.00)
Z COMBINED	14	702.00 (1825.37)	1	3364. (95.26)	6020. (170.69)	7370. (208.71)	8781. (248.66)	13470. (381.42)	21512. (609.16)
HYDROGRAPH AT	14	702.00 (1825.37)	1	43279. (1225.51)	86557. (2451.03)	100197. (3063.70)	129036. (3676.54)	173114. (4902.05)	216293. (6127.57)
Z COMBINED	14	1564.00 (4050.74)	1	46193. (1300.04)	91686. (2596.25)	114432. (3240.36)	137179. (3804.47)	182681. (5172.96)	228205. (6464.31)
ROUTED TO	14	1564.00 (4050.74)	1	3400. (96.20)	8700. (246.36)	8700. (246.36)	8700. (246.36)	8700. (246.36)	8700. (246.36)
ROUTED TO	15	1564.00 (4050.74)	1	3400. (96.20)	8700. (246.36)	8700. (246.36)	8700. (246.36)	8700. (246.36)	8700. (246.36)
Z COMBINED	15	2520.00 (6547.09)	1	14944. (423.15)	31661. (896.54)	37402. (1059.12)	43295. (1225.97)	55966. (1504.70)	68050. (1949.04)
ROUTED TO	10	2520.00 (6547.09)	1	14129. (400.37)	30071. (851.52)	35426. (1003.14)	40960. (1159.06)	52754. (1493.03)	64729. (1833.21)
HYDROGRAPH AT	16	191.00 (494.69)	1	8770. (240.33)	17539. (496.66)	21924. (620.03)	26309. (744.99)	35079. (993.32)	43849. (1241.65)
ROUTED TO	10	191.00 (494.69)	1	8307. (235.22)	16613. (470.43)	20766. (580.04)	24920. (705.65)	33226. (940.06)	41533. (1176.00)
Z COMBINED	10	2719.00 (7042.10)	1	14213. (402.46)	30219. (855.70)	35610. (1000.36)	41101. (1166.12)	53049. (1502.10)	65100. (1843.65)
HYDROGRAPH AT	17	201.00 (520.99)	1	11920. (337.54)	23040. (675.09)	29001. (843.06)	35761. (1012.63)	47601. (1350.17)	59601. (1607.71)

ROUTED TO	17	201.00 (520.99)	1	2523. (71.45)	3400. (96.20)	6060. (194.25)	10099. (300.61)	19286. (546.11)	27153. (760.87)
ROUTED TO	18	201.00 (520.99)	1	2440. (69.09)	3400. (96.20)	5197. (147.16)	8317. (235.52)	14130. (400.12)	20256. (573.50)
2 COMBINED	18	2920.00 (7562.77)	1	16040. (454.02)	33461. (947.51)	39010. (1104.64)	44501. (1262.40)	56449. (1590.46)	60523. (1940.35)
HYDROGRAPH AT	18	19.00 (49.21)	1	700. (20.04)	1416. (40.09)	1770. (50.11)	2124. (60.13)	2831. (80.18)	3539. (100.22)
2 COMBINED	18	2939.00 (7611.90)	1	16002. (455.30)	32529. (949.43)	39095. (1107.04)	44603. (1265.20)	56505. (1602.30)	60692. (1945.15)
ROUTED TO	21	2939.00 (7611.90)	1	15631. (443.19)	32572. (922.33)	37923. (1073.86)	43327. (1226.00)	54904. (1554.71)	66706. (1888.91)
HYDROGRAPH AT	19	90.00 (253.02)	1	5333. (151.02)	10666. (302.04)	13333. (377.55)	15999. (453.06)	21333. (604.07)	26666. (755.09)
ROUTED TO	21	90.00 (253.02)	1	3197. (90.54)	6395. (181.07)	7993. (226.34)	9592. (271.61)	12789. (362.15)	15986. (452.60)
2 COMBINED	21	3037.00 (7065.79)	1	15710. (444.04)	32603. (925.49)	30042. (1077.00)	43494. (1231.62)	55127. (1561.02)	66905. (1896.79)
HYDROGRAPH AT	20	74.00 (191.66)	1	9096. (257.56)	10191. (515.12)	12739. (643.90)	27207. (772.60)	36383. (1030.24)	45470. (1287.00)
ROUTED TO	20	74.00 (191.66)	1	179. (5.06)	350. (10.13)	456. (12.93)	555. (15.72)	757. (21.44)	1124. (31.03)
ROUTED TO	21	74.00 (191.66)	1	177. (5.01)	354. (10.02)	451. (12.70)	549. (15.54)	745. (21.00)	1090. (31.00)
2 COMBINED	21	3111.00 (8057.45)	1	15077. (449.59)	33016. (934.92)	30404. (1009.74)	44007. (1246.13)	55021. (1500.66)	67932. (1923.62)
HYDROGRAPH AT	21	27.00 (69.93)	1	1504. (44.05)	3160. (89.69)	3959. (112.12)	4751. (134.54)	6335. (179.39)	7919. (224.24)
2 COMBINED	21	3130.00 (8127.30)	1	15903. (450.31)	33065. (936.29)	30545. (1091.46)	44079. (1248.19)	55910. (1583.41)	68053. (1927.06)
ROUTED TO	22	3130.00 (8127.30)	1	15706. (447.01)	32015. (929.21)	30247. (1003.04)	43745. (1230.71)	55465. (1570.59)	67405. (1910.96)
HYDROGRAPH AT	22	90.00 (253.02)	1	7764. (219.04)	15527. (429.69)	19409. (549.61)	23291. (659.53)	31055. (879.38)	38019. (1099.22)
2 COMBINED	22	3236.00 (8301.20)	1	15027. (440.10)	32090. (931.55)	30351. (1005.97)	43069. (1242.23)	55630. (1575.27)	67692. (1916.02)
ROUTED TO	22	3236.00 (8301.20)	1	15035. (425.76)	27531. (779.59)	32506. (920.40)	37545. (1063.17)	48117. (1362.53)	50777. (1464.30)
ROUTED TO	26	3236.00 (8301.20)	1	14971. (423.92)	27442. (777.07)	32406. (917.62)	37409. (1059.30)	47930. (1357.23)	50540. (1457.66)
HYDROGRAPH AT	23	42.70 (110.59)	1	4410. (125.10)	8035. (250.19)	11044. (312.74)	13253. (375.29)	17671. (500.30)	22009. (625.40)
ROUTED TO	23	42.70 (110.59)	1	740. (21.10)	1736. (49.17)	2000. (56.63)	2210. (62.01)	4376. (123.91)	6539. (185.17)

ROUTED TO	25	42.70 (110.59)	1	586. (16.59)	1219. (37.35)	1467. (47.21)	1911. (54.13)	2720. (77.03)	3610. (102.22)
HYDROGRAPH AT	24	60.00 (176.12)	1	5101. (144.45)	10202. (280.90)	12753. (361.13)	15304. (433.35)	20405. (577.00)	25506. (722.25)
ROUTED TO	24	60.00 (176.12)	1	1160. (32.05)	1510. (42.90)	1620. (46.11)	1743. (49.35)	1909. (54.05)	2000. (56.63)
ROUTED TO	25	60.00 (176.12)	1	1005. (30.72)	1401. (41.95)	1594. (45.13)	1707. (48.33)	1874. (53.05)	2000. (56.63)
Z COMBINED	25	110.70 (284.71)	1	1656. (46.91)	2000. (79.29)	3261. (92.33)	3610. (102.46)	4594. (130.09)	5610. (158.05)
HYDROGRAPH AT	25	102.00 (264.10)	1	5570. (157.74)	11141. (315.40)	13926. (394.34)	16711. (472.21)	22202. (630.95)	27052. (788.69)
Z COMBINED	25	212.70 (550.09)	1	6264. (177.37)	12169. (344.50)	15006. (427.20)	17971. (500.09)	23907. (676.97)	29054. (845.30)
HYDROGRAPH AT	25	72.00 (186.40)	1	3355. (94.99)	6709. (189.90)	8306. (237.40)	10064. (284.97)	13410. (379.97)	16773. (474.96)
Z COMBINED	25	204.70 (737.37)	1	9262. (262.26)	10165. (314.37)	22501. (639.43)	26965. (763.56)	35099. (1016.54)	44044. (1269.05)
ROUTED TO	26	204.70 (737.37)	1	5545. (157.03)	10654. (301.69)	13130. (372.02)	15563. (440.69)	20730. (587.02)	25914. (733.01)
Z COMBINED	26	3520.70 (9110.57)	1	17440. (494.42)	20027. (816.30)	34150. (967.24)	39533. (1119.46)	50532. (1430.91)	61524. (1742.17)
ROUTED TO	28	3520.70 (9110.57)	1	16731. (473.76)	20545. (800.06)	33068. (959.02)	39250. (1111.67)	50202. (1421.55)	61123. (1730.02)
HYDROGRAPH AT	27	37.00 (95.03)	1	3270. (92.02)	6556. (185.64)	8195. (232.06)	9034. (270.47)	13112. (371.29)	16390. (464.11)
ROUTED TO	28	37.00 (95.03)	1	2110. (59.76)	4221. (119.51)	5276. (149.39)	6331. (179.27)	8441. (239.03)	10551. (298.70)
Z COMBINED	28	3537.70 (9214.40)	1	16750. (474.52)	20507. (809.50)	33096. (959.02)	39292. (1112.62)	50247. (1422.03)	61100. (1732.42)
HYDROGRAPH AT	29	100.00 (259.00)	1	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)
ROUTED TO	30	100.00 (259.00)	1	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)	0. (0.00)
HYDROGRAPH AT	30	529.00 (1370.10)	1	23305. (659.93)	44610. (1319.06)	50263. (1649.02)	69915. (1979.70)	93221. (2639.71)	116526. (3299.64)
Z COMBINED	30	629.00 (1629.10)	1	23305. (659.93)	44610. (1319.06)	50263. (1649.02)	69915. (1979.70)	93221. (2639.71)	116526. (3299.64)
ROUTED TO	31	629.00 (1629.10)	1	23305. (659.93)	44610. (1319.06)	50263. (1649.02)	69915. (1979.70)	93221. (2639.71)	116526. (3299.64)
HYDROGRAPH AT	31	144.00 (372.96)	1	4722. (133.71)	9404. (267.41)	11004. (334.27)	14165. (401.12)	10007. (534.03)	23609. (668.53)
Z COMBINED	31	773.00 (2002.06)	1	20027. (793.63)	56054. (1507.27)	70067. (1904.09)	84001. (2300.90)	112100. (3174.54)	140135. (3960.17)

HYDROGRAPH AT	31	105.00 (271.95)	1	5045.	10009.	12611.	15134.	20170.	25223.
				(142.05)	(205.69)	(357.11)	(420.54)	(571.30)	(714.23)
Z COMBINED	31	070.00 (2274.01)	1	32105.	64370.	80442.	96355.	120740.	160925.
				(911.30)	(1822.75)	(2270.44)	(2736.13)	(3445.50)	(4554.08)
HYDROGRAPH AT	31	200.00 (745.92)	1	8352.	16705.	20601.	25057.	33410.	41742.
				(236.51)	(473.03)	(591.20)	(709.54)	(946.06)	(1182.57)
Z COMBINED	31	1166.00 (3019.93)	1	36321.	73041.	91301.	109562.	144002.	182603.
				(1034.15)	(2040.29)	(2505.36)	(3102.44)	(4136.50)	(5170.73)
HYDROGRAPH AT	31	269.00 (696.71)	1	19077.	38153.	47691.	57230.	76306.	95383.
				(540.19)	(1000.30)	(1250.47)	(1620.57)	(2160.75)	(2700.94)
Z COMBINED	31	1435.00 (3716.63)	1	42095.	84990.	106230.	127405.	169900.	212476.
				(1203.33)	(2406.65)	(3008.32)	(3609.90)	(4813.31)	(6016.64)
ROUTED TO	31	1435.00 (3716.63)	1	0466.	12305.	14006.	15077.	19464.	23053.
				(245.30)	(340.44)	(390.87)	(449.59)	(551.15)	(652.79)
ROUTED TO	32	1435.00 (3716.63)	1	0466.	12305.	14006.	15077.	19464.	23053.
				(245.30)	(340.44)	(390.87)	(449.59)	(551.15)	(652.79)
HYDROGRAPH AT	32	20.00 (72.52)	1	1215.	2430.	3030.	3645.	4860.	6075.
				(34.41)	(68.81)	(86.02)	(103.22)	(137.62)	(172.03)
Z COMBINED	32	1463.00 (3709.15)	1	0004.	12502.	14309.	16110.	19761.	23409.
				(249.30)	(354.01)	(405.10)	(456.41)	(559.50)	(662.06)
ROUTED TO	20	1463.00 (3709.15)	1	0756.	12431.	14229.	16032.	19659.	23209.
				(247.95)	(352.02)	(402.92)	(453.90)	(556.69)	(659.47)
Z COMBINED	20	5020.70 (13003.55)	1	25503.	39439.	46390.	53447.	67711.	81954.
				(722.17)	(1116.79)	(1313.05)	(1512.45)	(1917.35)	(2320.69)
HYDROGRAPH AT	20	110.00 (204.90)	1	3626.	7251.	9044.	10077.	14503.	18120.
				(102.67)	(205.34)	(256.67)	(300.01)	(410.67)	(513.34)
Z COMBINED	20	5130.70 (13200.45)	1	26136.	40630.	46955.	53627.	67951.	82255.
				(740.00)	(1150.75)	(1329.62)	(1510.54)	(1924.16)	(2329.20)
ROUTED TO	33	5130.70 (13200.45)	1	24021.	40459.	46760.	53381.	67656.	81891.
				(736.03)	(1145.67)	(1324.32)	(1511.50)	(1915.79)	(2310.09)

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 BAR SAFETY VERSION JULY 1970
 LAST MODIFICATION 26 FEB 79

0
 TERMINAL 325 TIME OUT.

JOB# 3124 RUN# 7.366

Table I-1: Physical Characteristics of Lakes in the Basin

<u>Name</u>	<u>Regulating Agency</u>	<u>Drainage Area (sq. mi.)</u>	<u>Surface Area (sq. mi.)</u>	<u>Shoreline (miles)</u>	<u>Principal Regulation Purpose</u>
Canandaigua Lake	City of Canandaigua	184	16.57	36	WS, WQ, FC, Rec.
Keuka Lake	Village of Penn Yan	179	17.43	19	WS, SQ, Rec., FC
Seneca Lake	N.Y. Electric & Gas Co. & N.Y.S. Dept. of Transportation	714	66.9	75	WS, Nav., P, FC, Rec.
Cayuga Lake	N.Y.S. Dept. of Transportation	780	66.4	85	WS, Nav., Rec. FC
Owasco Lake	City of Auburn	206	10.25	25	WS, WQ, FC, Rec.
Skanateles Lake	City of Syracuse	74	13.8	33	WS, SQ, FC, Rec.
Otisco Lake	Onondaga County Water Authority	42.7	3.4	13	WS, SQ, FC, Rec
Oneida Lake	N.Y.S. Dept. of Transportation	1382	79.8	55	Nav., FC, Rec.

WS = Water Supply
WQ = Water Quality
FC = Flood Control
Nav. = Navigation
P = Power
Rec. = Recreation

STATION 04246500

ONEIDA RIVER AT CAUGHDENOV, N.Y.

TOTAL D.A. = 1382 CONTR. D.A. =
GAGE DATUM = 362.00 FT.

WATER YEAR	ANNUAL PEAK DISCH.CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK, FT	CODE	DATE	CODE
1903	13760	03-27-03	MO KR					
1904	11710	04-01-04	MO KR					
1905	13200	04-08-05	MO KR					
1906	6970	04-17-06	MO KR					
1907	7360	04-02-07	MO KR					
1908	7570	04-03-08	MO KR					
1909	9300	04-15-09	MO KR					
1910	10840	03-13-10	MO KR					
1911	7340	04-13-11	MO KR					
1912	10310	04-20-12	MO KR					
1913	7740	03-31-48	MO KR					
1914	5760	01-21-49	MO KR					
1915	9140	04-07-50	MO KR					
1916	8710	04-05-51	MO KR					
1917	6490	04-13-52	MO KR					
1918	6710	05-05-53	MO KR					
1919	6750	04-19-54	MO KR					
1920	7490	03-26-55	MO KR					
1921	8120	04-18-56	MO KR					
1922	4900	12-05-56	MO KR					
1923	5440	04-11-58	MO KR					
1924	8340	04-11-59	MO KR					
1925	8500	04-07-60	MO KR					
1926	8490	05-01-61	MO KR					
1927	6730	05-02-62	MO KR					
1928	7720	04-06-63	MO KR					
1929	6330	04-20-64	MO KR					
1930	7160	04-26-65	MO KR					
1931	6510	04-28-66	MO KR					
1932	6040	12-14-66	MO KR					
1933	7250	04-06-68	MO KR					
1934	8010	05-22-69	MO KR					
1935	6550	04-20-70	MO KR					
1936	7320	05-11-71	MO KR					
1937	10100	06-25-72	MO KR					
1938	7590	04-09-73	MO KR					
1939	7510	05-14-74	MO KR					
1940	7460	09-29-75	MO KR					

1423

ASC

ET AUGUST 1955

TOTAL D.A. = 208.00 CONTR. D.A. =
GAGE DATUM = 533.92 FT.

WATER YEAR	ANNUAL PEAK DISCH. CFS	DATE	CODES	HIGHEST SINCE	GAGE WEIGHT OF ANNUAL PEAK, FT	CODE	ANNUAL MAX GAGE HT. FT	DATE	CODE
1914	1450	04-03-14	KR		4.43				
1915	1260	02-26-15	KR		3.63				
1916	1720	04-03-16	KR		4.21				
1917	1070	06-30-17	KR		3.77				
1918	1100	03-17-18	KR		3.50				
1919	1160	04-12-19	KR		3.55				
1920	1460	03-29-20	KR		3.84				
1921	1040	03-16-21	KR		3.44				
1922	1620	06-22-22	KR		4.05				
1923	1230	03-26-23	KR		3.61				
1924	1190	01-28-24	KR		3.74				
1925	1250	02-27-25	KR		3.66				
1926	1140	04-12-26	KR		3.56				
1927	1110	03-27-27	KR		3.53				
1928	1620	12-02-27	KR		4.05				
1929	1400	04-22-29	KR		4.35				
1930	1110	06-10-30	KR		3.53				
1931	1260	04-04-31	KR		3.67				
1932	1620	04-04-32	KR		4.06				
1933	920	04-04-33	KR		3.32				
1934	696	04-05-34	KR		3.07				
1935	1040	04-20-35	KR		3.50				
1936	2090	03-19-36	KR		4.88				
1937	1040	01-28-37	KR		3.46				
1938	1350	05-29-38	KR		3.72				
1939	1060	02-28-39	KR		3.45				
1940	2090	04-09-40	KR		4.88				
1941	1300	04-08-41	KR		3.75				
1942	1510	03-17-42	KR		3.98				
1943	1410	12-31-42	KR		4.02				
1944	1210	04-13-44	KR		3.57				
1945	2030	03-22-45	KR		4.61				
1946	1000	03-09-46	KR		3.36				
1947	1420	06-07-47	KR		3.80				
1948	1400	03-22-48	KR		3.78				
1949	732	02-16-49	KR		3.04				
1950	2090	04-04-50	KR		4.72				
1951	1270	12-11-50	KR		3.63				
1952	879	02-06-52	KR		3.21				
1953	596	05-15-53	KR		2.87				
1954	1160	05-05-54	KR		3.51				
1955	1430	03-12-55	KR		4.31				
1956	1740	04-08-56	KR		4.25				
1957	800	04-25-57	KR		3.10				
1958	1900	04-08-58	KR		4.42				
1959	1240	04-09-59	KR		3.64				
1960	1970	04-05-60	KR		4.51				
1961	1450	02-28-61	KR		4.07				
1962	1550	03-31-62	KR		3.86				
1963	1750	03-29-63	KR		4.13				
1964	1740	03-14-64	KR		4.14				
1965	514	04-21-65	KR		2.14				

STATION 04235500 OMASCO LA E OUTLET NEAR ALBURN, N.Y.

TOTAL D.A. = 288.00 CONTR. D.A. =
GAGE DATUM = 533.92 FT.

WATER YEAR	ANNUAL PEAK DISCH., CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK, FT	CODE	ANNUAL MAX GAGE HT., FT	DATE	CODE
1966	1270	04-28-66	KR		3.62	BV			
1967	101	04-04-67	KR		2.99				
1968	1070	06-28-68	KR		3.64				
1969	1450	04-10-69	KR		3.99				
1970	1490	04-10-70	KR		4.04				
1971	1710	04-15-71	KR		4.12				
1972	3250	06-23-72	KR		6.28				
1973	1370	12-09-72	KR		3.75				
1974	1740	04-06-74	KR		4.19				
1975	1040	09-27-75	KR		4.38				

STATION 04237500 SENECA RIVER AT BALDWINVILLE, N.Y.

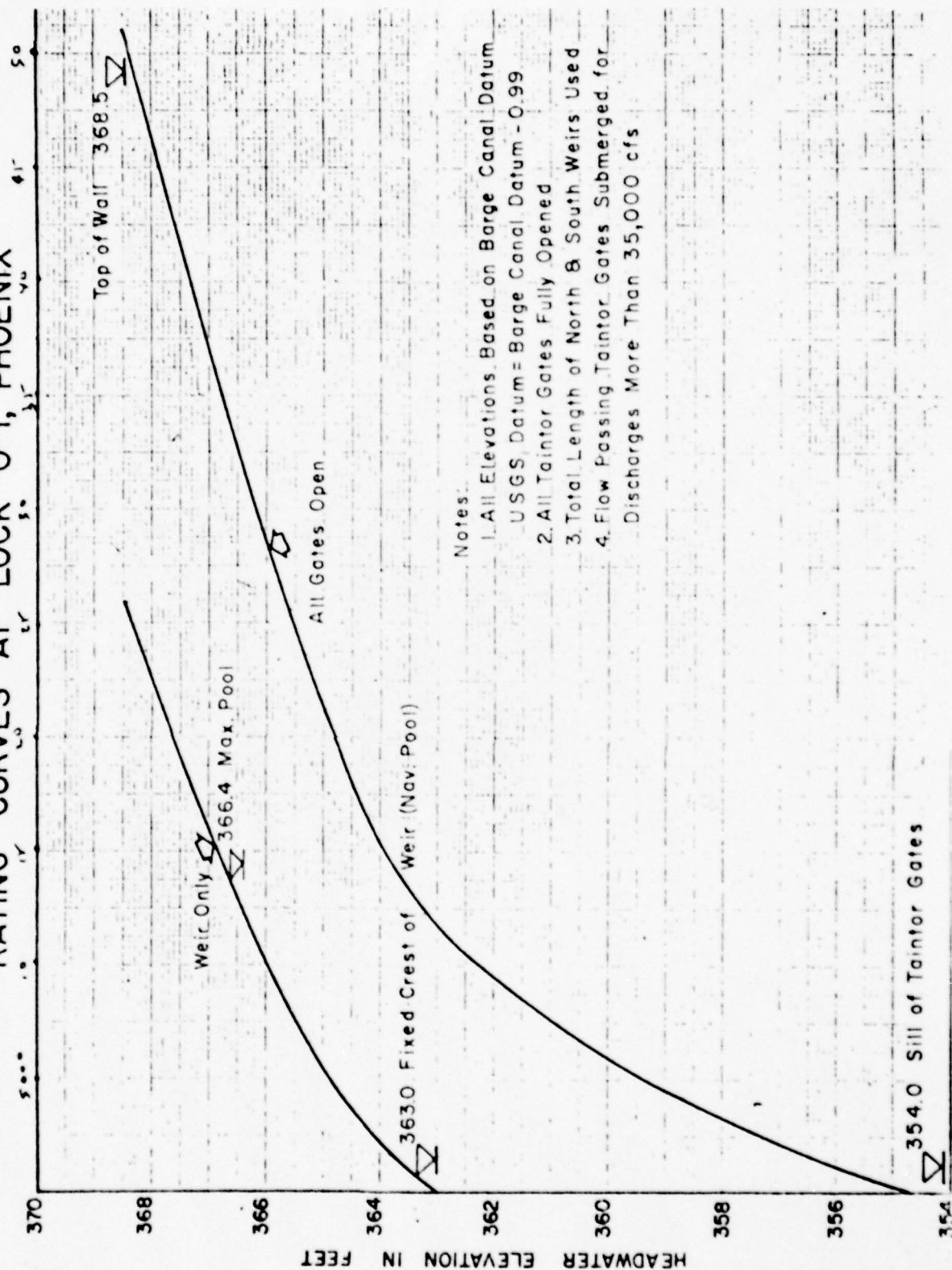
TOTAL D.A. = 3130.00 CONTR. D.A. =
GAGE DATUM = 362.00 FT.

WATER YEAR	ANNUAL PEAK DISCH, CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK, FT	CODE	ANNUAL MAX GAGE HT, FT	DATE	CODE
1950	15700	04-01-50	KR		8.50				
1951	11800	02-24-51	MO KR		6.73				
1952	10700	03-14-52	MO KR		5.90				
1953	8800	03-29-53	MO KR		5.25				
1954	9090	05-06-54	MO KR		5.27				
1955	11900	03-18-55	MO KR			MM	6.84	03-23-55	
1956	16700	03-12-56	MO KR		8.84				
1957	7430	01-24-57	MO KR		4.73				
1958	10700	04-24-58	MO KR		5.92				
1959	11500	04-04-59	MO KR		6.43				
1960	17200	04-04-60	MO KR		9.21				
1961	11600	04-29-61	MO KR		6.09				
1962	8190	03-15-62	MO KR		4.96				
1963	10100	03-22-63	MO KR		5.57				
1964	9940	03-18-64	MO KR		5.30				
1965	5940	02-13-65	MO KR		3.93				
1966	8450	03-04-66	MO KR			MM	4.99	03-07-66	
1967	6540	05-16-67	MO KR			MM	4.21	05-15-67	
1968	8090	04-05-68	MO KR				4.84	03-27-68	MM
1969	9440	04-27-69	MO KR				5.42	04-27-69	
1970	10680	04-05-70	MO KR				5.83	04-04-70	
1971	14400	03-19-71	MO KR				7.53	03-19-71	
1972	17200	06-28-72	MO KR				9.21	06-30-72	
1973	12100	04-08-73	MO KR						
1974	8970	04-05-74	MO KR						
1975	10500	09-29-75	MO KR						
					6.75				
					5.77				
					6.62				

HYDRAULICS

Figure C-21 Rating Curve At Lock 0-1
Figure C-22 Stage Discharge Computations
Figure C-23 Stage Discharge Curve
Figure C-24 Stage Storage Computations

RATING CURVES AT LOCK 0-1, PHOENIX



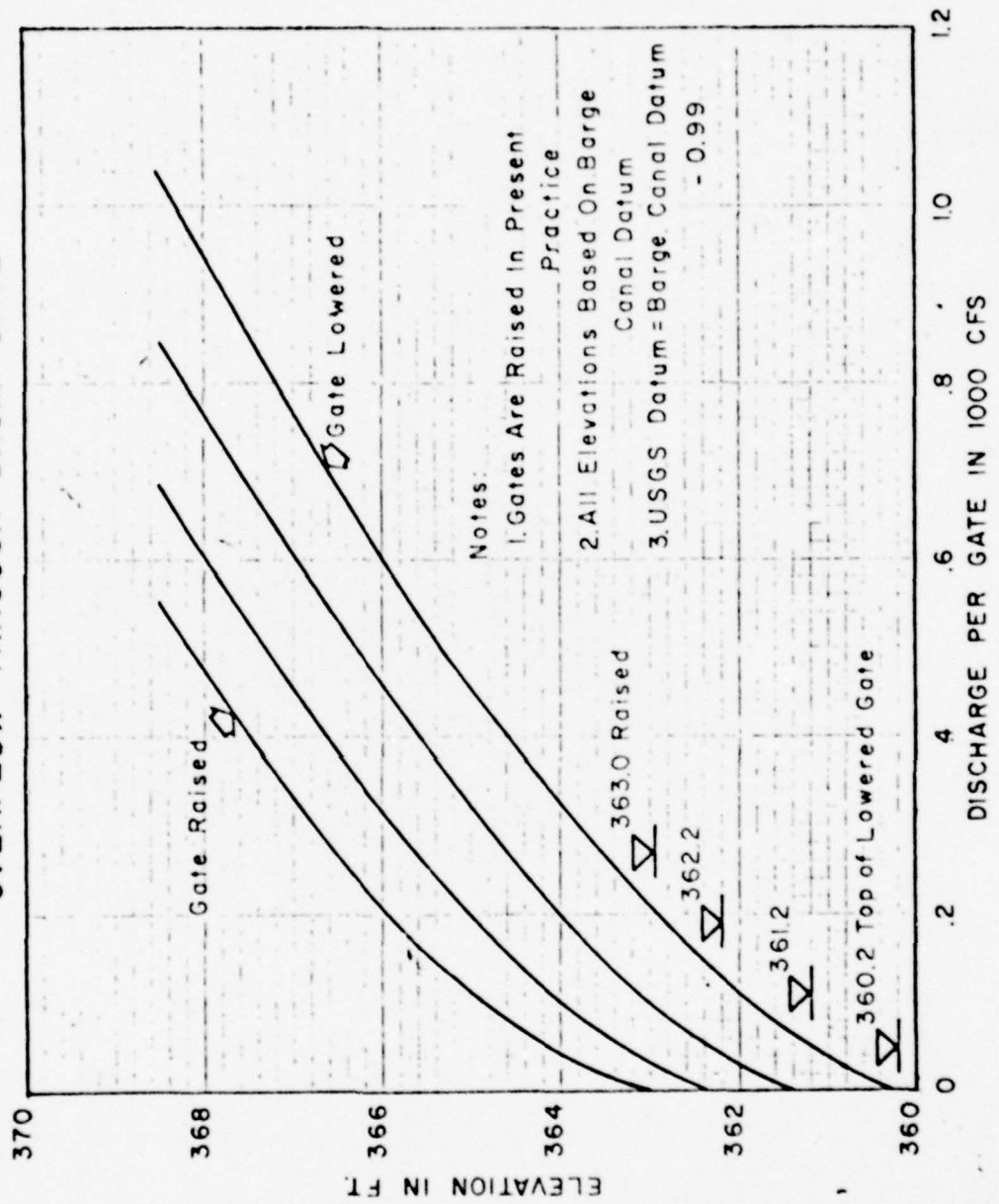
Notes:

1. All Elevations Based on Barge Canal Datum
2. USGS Datum = Barge Canal Datum - 0.99
3. All Taintor Gates Fully Opened
4. Total Length of North & South Weirs Used
5. Flow Passing Taintor Gates Submerged for Discharges More Than 35,000 cfs

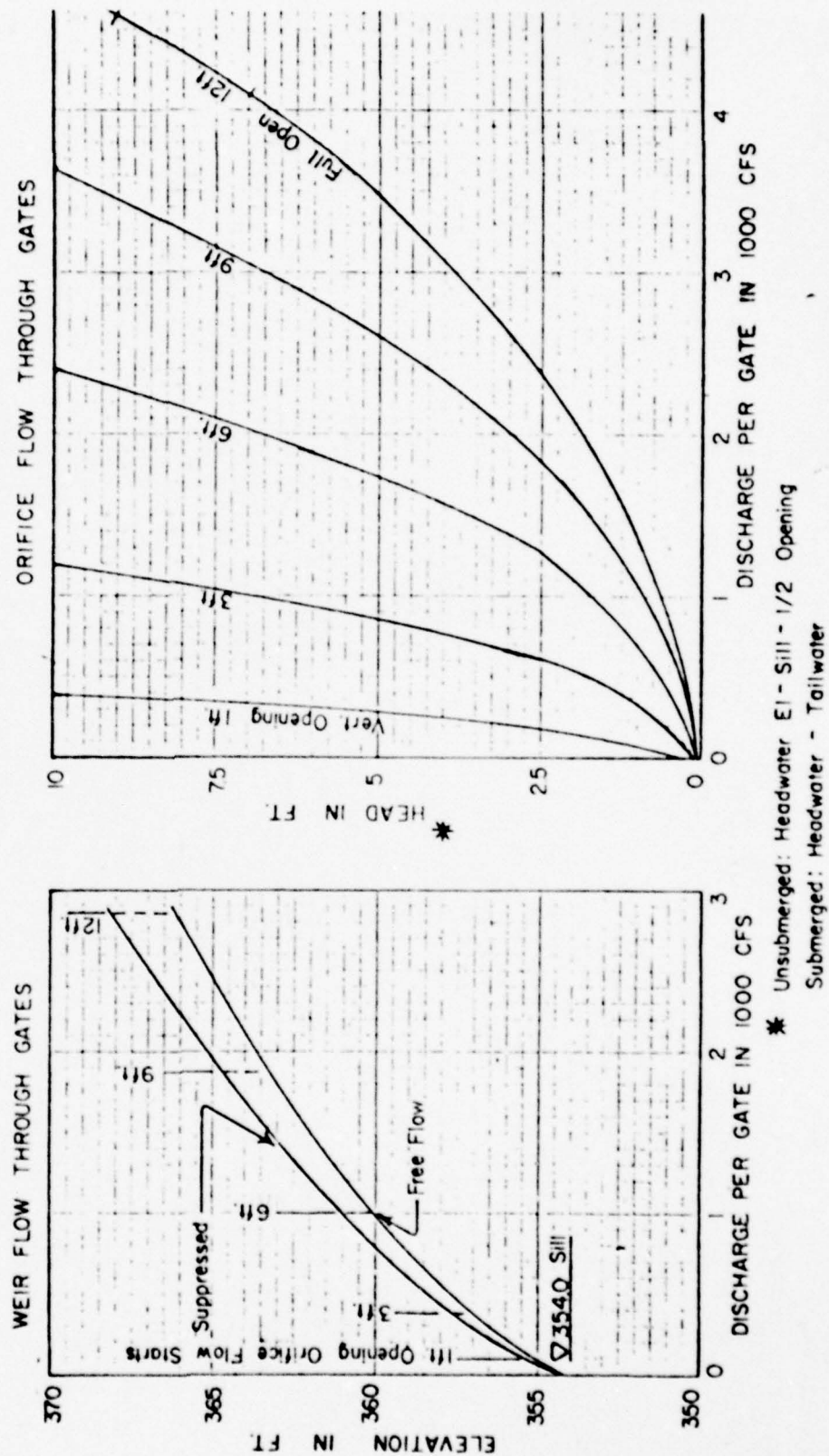
354.0 Sill of Taintor Gates

RATING CURVES AT LOCK 0-1, PHOENIX

OVERFLOW THROUGH DRUM GATE

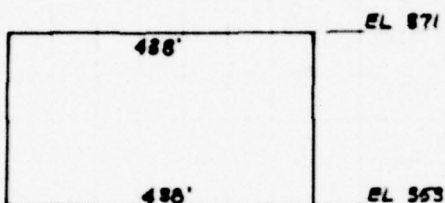


RATING CURVES AT LOCK 0-1, PHOENIX



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ACROSS OLD DAM IMMEDIATELY BELOW SPILLWAY



$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$$A = 7884$$

$$S = .004 \text{ /ft}$$

$$n = .035$$

ELEV	h	1.49/n	A	R	S	Q
353	0	42.57	0	0	.004	0
354	1		438	1		1179
355	2		876	2		3748
356	3		1314	3		7386
357	4		1752	4		11941
358	5		2190	5		17333
359	6		2628	6		23503
360	7		3066	7		30403
361	8		3504	8		37999
362	9		3942	9		46259
363	10		4380	10		55158
364	11		4818	11		64675
365	12		5246	12		74790
366	13		5694	13		85486
367	14		6132	14		96748
368	15		6570	15		108563
369	16		7008	16		120917
370	17		7446	17		133800
371	18		7884	18		147202
372	19		8322	19		161111
373	20		8760	20		175521
374	21	42.57	9190	21	.004	190255

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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.25.79
SUBJECT PHOENIX DAM - LOCK #1 PROJECT NO. 2305
STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG/NFO

FREE WEIR FLOW

SPILLWAY = 553' LENGTH

 $C_d = 4.03$ $H_d = 2.80'$ (ASSUMED)

ELEV	H_e	H_e/H_d	C/C_d	C	$Q = C L H_e^{1.5}$
363	0	0	0	0	0
364	1	.36	.86	3.466	1917
365	2	.71	.95	3.828	5987
366	3	1.07	1.01	4.070	11695
367	4	1.43	1.025	4.131	18275
368	5	↓	↓	↓	25541
369	6				33575
370	7				42309
371	8				51691
372	9				61680
373	10				72241
374	11				83343
375	12				94963
376	13				107077
377	14				119666
378	15				132714
379	16				146204
380	17				160123
381	18				174457
382	19				189195
383	20	1.43	1.025	4.131	204330

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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.25.79
SUBJECT PHOENIX DAM - LOCK # 1 PROJECT NO. 2305
STAGE - DISCHARGE RELATIONSHIP DRAWN BY JR. ANFD

FREE WEIR FLOW
Tainter Gates (Closed)
 $L = 190'$ $C = 3.0$

<u>ELEV</u>	<u>H</u>	<u>C</u>	<u>L</u>	<u>$Q = C L H^{1.5}$</u>
366	0	3.0	190	0
367	1			480
368	2			1358
369	3			2494
370	4			3810
371	5			5367
372	6			7055
373	7			8890
374	8			10861
375	9			12960
376	10			15179
377	11			17512
378	12			19953
379	13			22499
380	14			25144
381	15			27885
382	16			30720
383	17	30	190	33645



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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-25-79
 SUBJECT PHOENIX DAM - LOCK #1 PROJECT NO 2805
STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG & UFD

SUBMERGENCE CORRECTION
TAINTER GATES ONLY

ELEV	d	h _d	H _e	Q _{observed}	$\frac{h_d + d}{H_e}$	$\frac{h_d}{H_e}$	%
373	14.5	2.8	10	75000	1.73	.28	3
375	16.5	↓	12		1.61	.23	6
377	18.5		14		1.52	.20	10
379	20.5		16		1.46	.18	11
381	22.5		18		1.41	.16	15
383	24.5	2.8	20		1.37	.14	16

FREE DISCHARGE - Q TOTAL

ELEV	SPILLWAY	TAINTER GATES (used)	Q _{TOTAL}	Q _{SUBMERGENCE}
363	0	0	0	-
365	5987	0	5987	-
367	18275	480	18755	-
369	33575	2494	36069	-
371	51691	5367	57058	-
373	72241	8590	81131	78697
375	94963	12960	107923	101447
377	119666	17512	137178	123460
379	146204	22499	168703	150146
381	174457	27885	202342	171991
383	204330	33645	237975	199899



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PROJECT NAME NEW YORK STATE DAM INSPECTIONDATE 9-25-79SUBJECT PHOENIX DAM - LOCK #1PROJECT NO 2305STAGE - DISCHARGE RELATIONSHIPDRAWN BY JPB & NFOSUBMERGED FLOWTAINTER GATES: TRUNION HT = $a = 15'$
(FULLY OPENED) $R = 20'$ $a/R = .75$ $G_o = 12'$ $G_o/R = .6$ $D = 190'$

$$Q = C_s \sqrt{h_s} \sqrt{2gh}$$

ELEV	h_s	$h + h_s$	h	h/G_o	C_s	Q
366	12	15	3	1.0	1.0	31691
367	13	16	3	1.08	1.0	34332
368	14	17.5	3.5	1.16	1.0	39936
369	15	18.6	3.6	1.25	1.0	43395
370	16	19.8	3.8	1.33	1.0	47556
371	17	21.0	4	1.42	1.0	51841
372	18	22.0	4	1.50	.90	49402
373	19	23.0	4	1.58	.85	49249
374	20	24.0	4	1.67	.70	42693
375	21	25.3	4.3	1.75	.60	39838

DISCHARGE - Q_{TOTAL}

ELEV	SPILLWAY	TAINTER GATES	Q _{TOTAL}
364	1917	0	1917
366	11695	31691	43386
368	25541	39936	65477
370	42309	47556	89865
372	61680	49402	111082
374	83348	42693	126036



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PROJECT NAME NEW YORK DAM INSPECTION

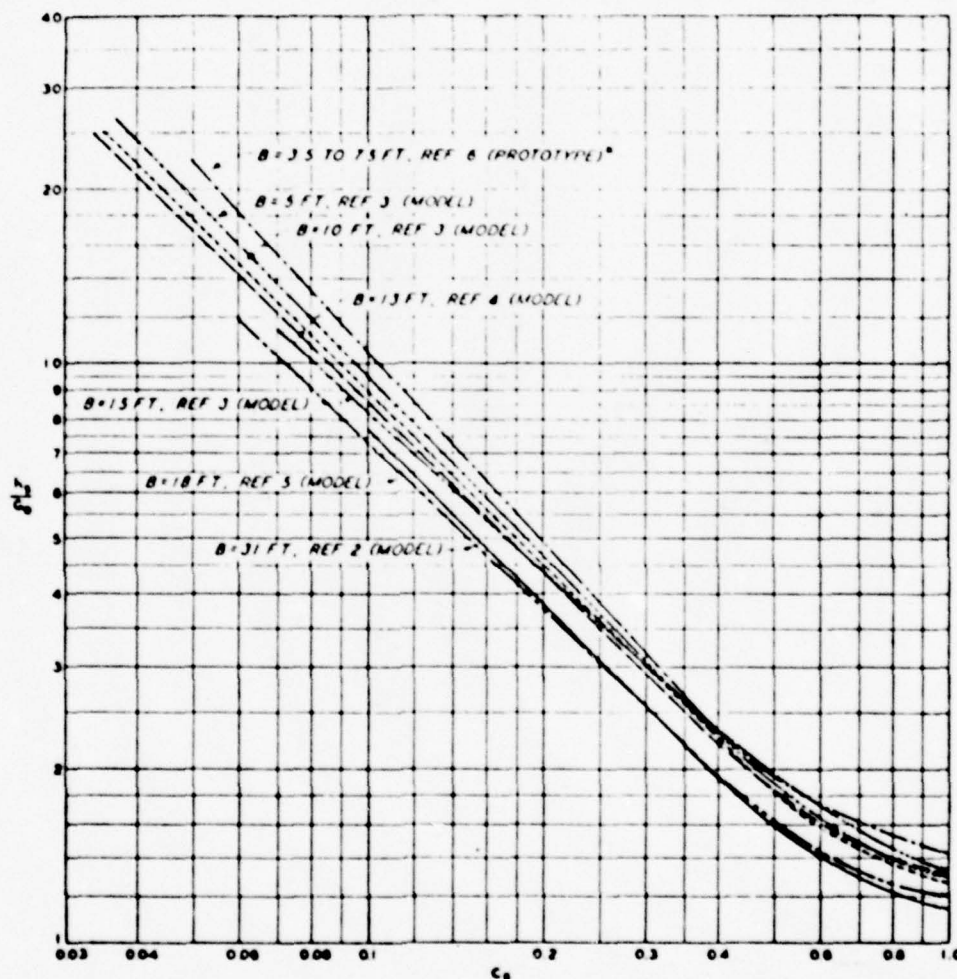
DATE 6-25-79

SUBJECT PHOENIX DAM - LOCK #1

PROJECT NO 2305

STAGE - DISCHARGE RELATIONSHIP

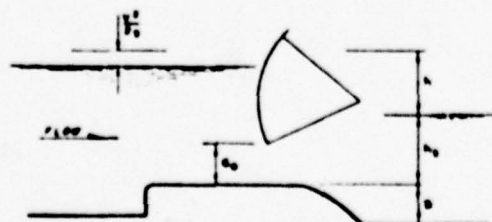
DRAWN BY JPG



BASIC EQUATION

$$Q = C_d L h_o \sqrt{2gh}$$

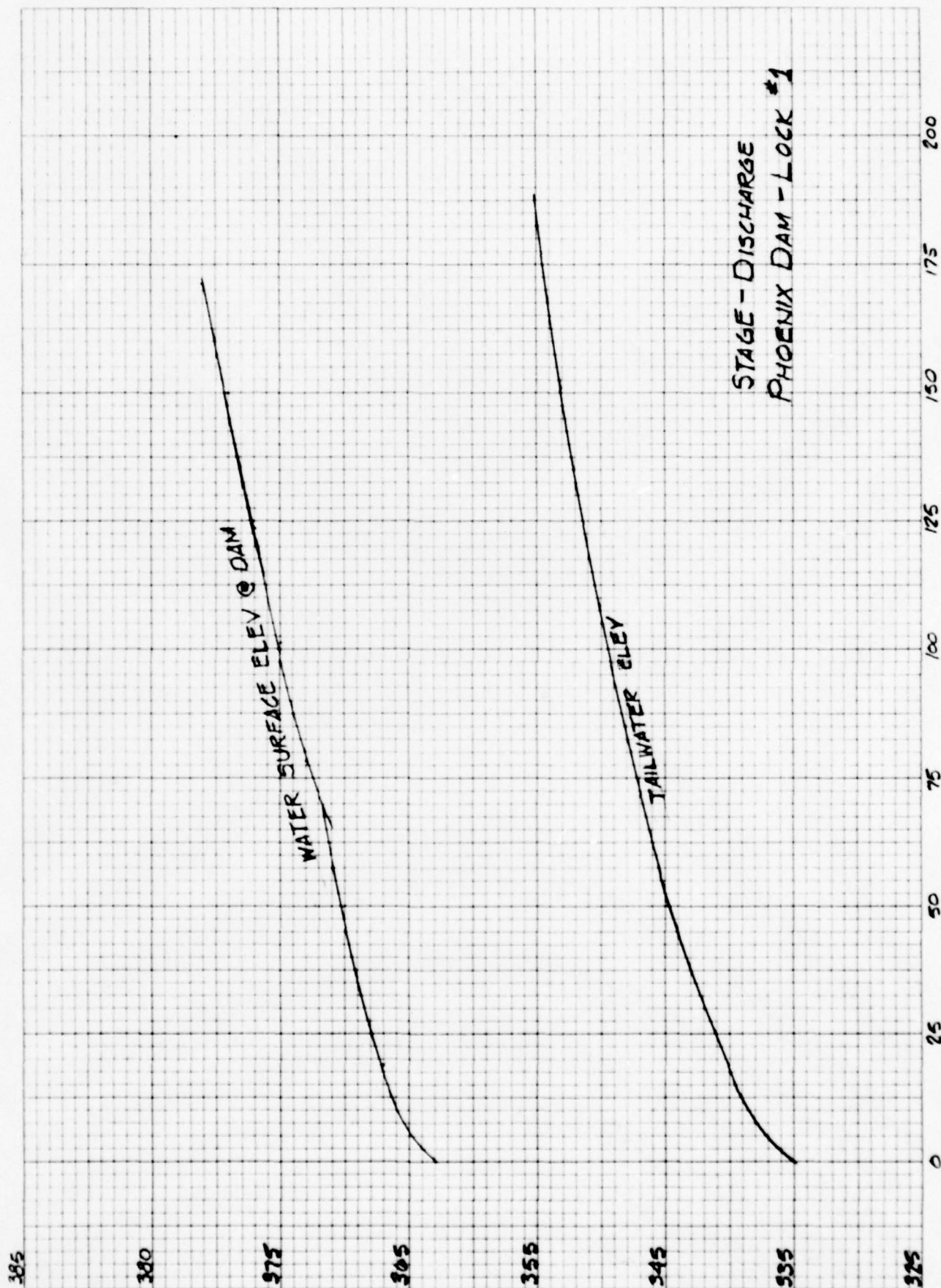
* MISSISSIPPI RIVER DAMS 2, 5A, AND 26



DEFINITION SKETCH

TANTIER GATES IN
OPEN CHANNELS
DISCHARGE COEFFICIENT
SUBMERGED FLOW

C-22e



STAGE - DISCHARGE
PHOENIX DAM - LOCK #1

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PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6.15.79
SUBJECT PHOENIX DAM - LOCK #1 PROJECT NO 2305
STAGE - STORAGE RELATIONSHIP DRAWN BY JP6

<u>ELEV</u>	<u>END AREA (ACRS)</u>	<u>VOL (ACRS-FT)</u>	<u>STORAGE (ACRS-FT)</u>
352			
354	.0219	1752	1752
356	.0226	1808	3560
358	.0234	1872	5432
360	.0242	1936	7368
362	.0249	1992	9360
364	.0256	2048	11408
366	.0264	2112	13520
368	.0271	2168	15688
370	.0278	2224	17912
372	.0286	2288	20200
374	.0293	2344	22544
376	.0300	2400	24944
378	.0308	2464	27408
380	.0315	2520	29928

APPENDIX D
STABILITY ANALYSIS



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DESIGN BRIEF

PROJECT NAME PHOENIX DAM - LOCK #1

DATE _____

SUBJECT STABILITY ANALYSIS -

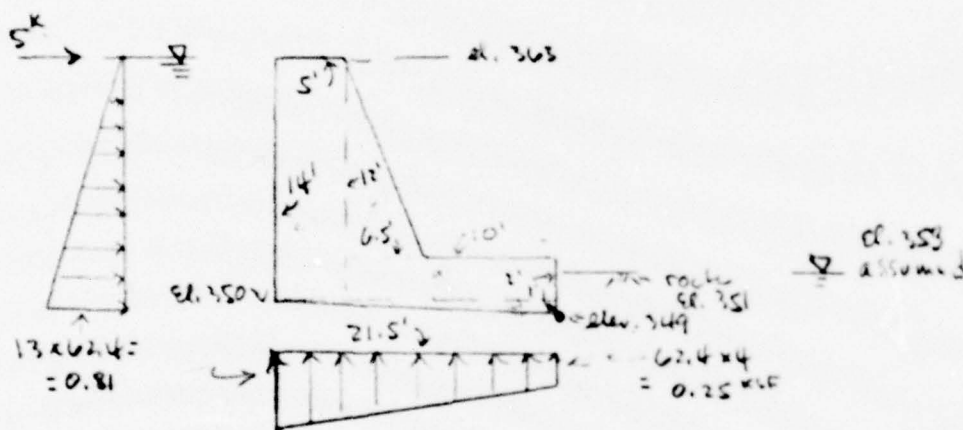
PROJECT NO. _____

OVERTURNING & SLIDING

DRAWN BY _____

see attached sheet for dam cross-section

I. WL @ top of dam, ice acting

elev. 363 ups
353 ds

(i) resisting ovt moment about toe: mass of dam =

$$= (2 \times 16.5 \times \frac{16.5}{2} \times .15) + (\frac{1}{2} \times 12 \times 6.5 \times .15) \times (10 + \frac{2}{3} \times 6.5) + (5 \times 14 \times .15) \times (16.5 + \frac{5}{2}) + (\frac{21.5}{2} \times 1 \times .15) \times (\frac{21.5}{2}) = 40.8 + 84 + 199.5 + 11.6 = 335.9 \text{ }^{\text{K}}$$

(ii) horiz. water pressure behind dam = $(0.81 \text{ }^{\text{K}} \times \frac{13}{2}) \times (\frac{13}{2} + 1) = 78.1 \text{ }^{\text{K}}$

$$\text{(iii) uplift on base of dam} = (0.25 \times 21.5 \times \frac{21.5}{2}) + (0.56 \times \frac{21.5}{2} \times \frac{2 \times 21.5}{3}) = 57.8 + 86.3 = 144 \text{ }^{\text{K}}$$

$$\text{(iv) ice at top of dam} = 5' \times 14' = 70 \text{ }^{\text{K}}$$

$$\text{FS against overturning} = \frac{336 \text{ }^{\text{K}}}{78.1 + 144 + 70} = 1.39 \quad \left(\begin{array}{l} \text{ice and} \\ \text{uplift} \\ \text{act} \end{array} \right)$$

note: downstream resistance provided by downstream rock and key neglected



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SUBJECT _____ PROJECT NO. _____

DRAWN BY _____

$$FS \text{ against overturning} = \frac{336}{28.1 + 144 + (1.470)} = 1.21 \quad \left(\begin{array}{l} 7.5^k \text{ ice, plus} \\ \text{uplift, act} \end{array} \right)$$

Position of resultant passing through base

let d = distance from toe to position of resultant

$$d = \frac{\sum M_{\text{toe}}}{\sum V} = \frac{336'' - 242''}{22.2^k - 11.4^k} = \frac{94''}{10.8^k} = 8.7' \quad \left(\begin{array}{l} \text{for uplift} \\ 5^k \text{ ice acting} \end{array} \right)$$

$$\text{if } b = 21.5'$$

$$d = \frac{8.7}{21.5}(b) = 0.4 b \quad (\text{within mid-third})$$

$$d = \frac{336 - 277}{10.8} = \frac{5.46}{10.8} = \frac{5.46}{21.5} b = 0.25 b \quad (\text{outside mid-third})$$

[for uplift 7.5^k ice act]

$$FS = \frac{336}{47 + 180} = 2.65$$

(5^k ice acts,
no uplift)

- ok -

$$= \frac{336}{168} = 2.0$$

(10^k ice acts,
no uplift)

- ok -



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PROJECT NAME _____

DATE _____

SUBJECT _____

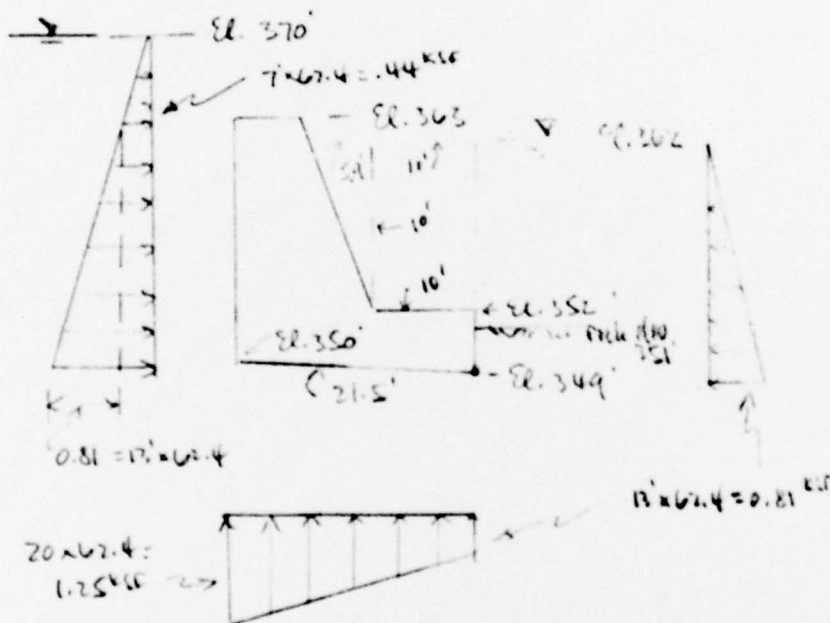
PROJECT NO. _____

DRAWN BY _____

II.

WL @ $\frac{1}{2}$ PMF levels

[upst elev 370'
ds elev 362']



(i) resisting ovt moment about toe = $336 + \left[(10 \times 10 \times 62.4 \times \frac{10}{2}) + \left(\frac{10 \times 54}{2} \times 62.4 \right) \left(\frac{54}{3} + 10 \right) + (0.81 \times \frac{13}{2} \times \frac{13}{2}) \right] = 336 + 31.2 + 22 + 22 = 412$

(ii) ovt due to horiz. water pressure behind dam =

$$= (0.44 \times 13) \left(\frac{13}{2} + 1 \right) + (0.81 \times \frac{13}{2}) \left(\frac{13}{2} + 1 \right) = 71$$

(iii) uplift on base of dam = $(0.81 \times 21.5 \times \frac{21.5}{2}) + (0.44 \times \frac{21.5}{3} \times 2 \times \frac{21.5}{3}) = 255$

$$FS \text{ against overturning} = \frac{412}{255 + 71} = 1.26 \pm$$

full
uplift
(action)



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PROJECT NAME _____

DATE _____

SUBJECT _____

PROJECT NO. _____

DRAWN BY _____

Position of resultant passing through base,

$$d = \frac{\sum M}{\sum V} = \frac{412 - 326}{22.2 - \left(\frac{1.25 + 0.81}{2} \right) (21.5) + \left(\frac{15.1 + 10}{2} \right) (10 \times 0.4)} = \frac{86^{\text{K}}}{8.05^{\text{K}}} = 10.6'$$

$$\text{if } b = 21.5', d = (10.6/21.5)(b) = 0.5(b)$$

with full ~~part~~ uplift actingif uplift acting is as for normal WL (extra uplift does not have time to develop)

$$FS = \frac{412^{\text{K}}}{71^{\text{K}} + 144^{\text{K}}} = 1.92 \quad \text{against overturning}$$

Position of resultant passing through base

$$d = \frac{\sum M}{\sum V} = \frac{412 - 215}{22.2 - 11.4 + 8.1} = 10.4 = \underline{0.48(b)}$$

with
no uplift



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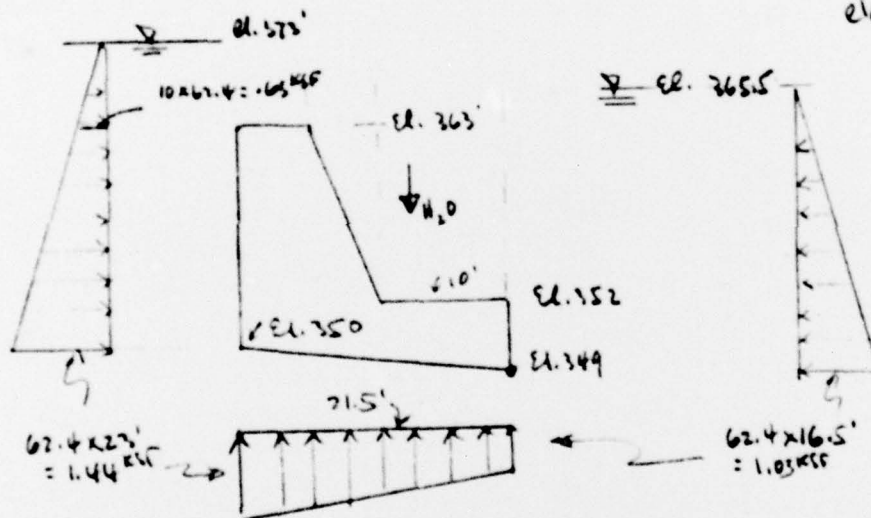
PROJECT NO. _____

DRAWN BY _____

III. WL @ PMF elevations upstream and downstream

elev. upstream = 373', 10' above spillway

elev. downstream = 365.5'



(i) resisting out moment = mass of dam + upstream water on top of dam + lat. p

$$= 336^{1k} + \left[(17.5' \times 10' \times 62.4 \times \frac{10}{2}) + (\frac{1}{2} \times 6.5 \times 17.5 \times 62.4 \times 10 + \frac{1}{2} \times 6.5) \right] + (1.03 \times \frac{16.5}{2} \times \frac{16.5}{2})$$

$$= 336^{1k} + 42 + 33.3 + 4607 = 458^{1k}$$



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PROJECT NAME _____

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SUBJECT _____

PROJECT NO. _____

DRAWN BY _____

(ix) moment causing overturning : upst. water press + uplift =

$$= 28.1 + (6.24)(13)(\frac{13}{2} + 1) + \left[(1.03 \times 21.5 \times \frac{21.5}{2}) + (0.41 \times \frac{21.5}{2} \times \frac{2 \times 21.5}{3}) \right] =$$

$$= 28.1 + 60.8 + 238 + 63.2 = 390 \text{ }^{\text{K}}$$

FS against overturning =

$$= \frac{458}{390} = 1.17 \pm \quad (\text{uplift acting})$$

$$= \frac{458}{89} = 5.2 \pm \quad (\text{no uplift})$$

note: downstream resistance provided by downstream rock and key neglected

Position of resultant passing through base

$$d = \frac{\sum M}{\sum V} = \frac{458 - 390}{22.2 + \left(\frac{16.5 + 10}{2} \right) (13.5 \times 67.4) - \left(\frac{11.44 + 1.03}{2} \right) (21.5)}$$

$$= \frac{68}{22.2 + 11.1 - 26.6} = \frac{68}{6.7} = 10.14'$$

if $b = 21.5'$, $d = (10.14/21.5) b = 0.47(b)$ (inside mid with uplift)



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PROJECT NAME _____

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SUBJECT _____

PROJECT NO. _____

DRAWN BY _____

if uplift acting is as for normal WL (extra uplift does not have time to develop)

$$FS \text{ against out} = \frac{458^{12}}{89 + 144} = \underline{1.97}$$

$$\text{Position of resultant passing through base, } d = \frac{458 \cdot 233}{22.2 - 11.4 + 11.1} = \underline{10.3}$$

21.8

$$\text{in terms of } b, d = \frac{10.3}{21.5} = \underline{0.48} b \text{ (within middle third)}$$



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SUBJECT _____

PROJECT NO. _____

DRAWN BY _____

SLIDING

I. WL @ normal pool elevation

$$(i) \text{ weight of dam} = (2 \times 16.5 \times 11.5) + \left(\frac{1}{2} \times 12 \times 6.5 \times 11.5\right) + (5 \times 14 \times 11.5) + \left(\frac{21.5}{2} \times 1 \times 11.5\right) = 5 + 5.8 + 9.8 + 1.6 = 22.2^k$$

$$(ii) \text{ horiz. water pressure upstream} = \left(0.81 \times \frac{13}{2}\right) = 5.2^k$$

$$(iii) \text{ uplift on base of dam} = \left(\frac{0.81 + 0.25}{2}\right) (21.5') = 11.4^k$$

FS against sliding (friction-shear method, using 50 psi bond-shear between dam concrete and bedrock, $\mu = 0.65$)

$$FS = \frac{W + \text{bond/shear}}{\text{upstream water press.} + \text{ice}} = \frac{(0.65)(22.2 - 11.4) + (0.5 \times 14 \times 21.5)}{5.2 + 7.5}$$

$$= \frac{7 + 15.5}{10.7} = 12.6^{\pm} \quad \left(\begin{array}{l} \text{uplift and} \\ \text{ice act} \end{array}\right) - ok$$

$$= 10.6^{\pm} \quad \left(\begin{array}{l} \text{uplift and} \\ \text{ice act} \end{array}\right) - ok$$

FS against sliding (friction only, no shear-bond on base)

$$= \frac{7}{10.7} = 0.7^{\pm}$$

(uplift and
ice act) - ok

$$FS \text{ against sliding} = \frac{(0.65 \times 22.2)}{10.7} = 1.4 \quad \left(\begin{array}{l} \text{no uplift,} \\ \text{ice acts} \end{array}\right) - ok$$



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DRAWN BY _____

II. WL @ PMF elevations

(i) wt. of dam = 22.2^k

(ii) downstream H_2O above dam section = $(13.5 \times 10 \times 0.4) + (\frac{1}{2} \times 6.5 \times 13.5)$
 $= 8.4^k + 2.7^k = 11.1^k$

(iii) downstream horz. water pressure = $(1.03 \times 16.5 \times \frac{1}{2}) = 8.5^k$

(iv) upstream water pressure = $(\frac{0.63 + 1.44}{2})(13') = 13.5^k$

(v) uplift pressure on base of dam = $(\frac{1.44 + 1.0}{2})(21.5') = 26.2^k$

(vi) normal WL uplift = 11.4^k

FS against sliding (friction-shear method, using 50 psi bond shear between dam and bedrock, $\mu = 0.65$)

$$FS = \frac{(0.65)(22.2 + 11.1 + 11.4) + (0.5 \times 14.4 \times 21.5) + 8.5}{13.5^k} = 13 \pm$$
 normal WL
(uplift)
(acting)

[note: assume bond between concrete and bedrock
resists net uplift on dam base]

$$FS = \frac{(0.65)(22.2 + 11.1) + 8.5}{13.5} = 2.3 \pm$$

(no uplift,
no bond between
dam and rock)

note: sliding analysis have neglected resistance provided by
downstream rock and key



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III WL @ $\frac{1}{2}$ PMF elevation

(i) wt. of dam = 22.2^k

(ii) ds H₂O above dam section = $\left(\frac{15.4+10}{2}\right)(10 \times 62.4) = 8.0^k$

(iii) ds horz. water pressure = $\left(0.81 \times \frac{15}{2}\right) = 5.7^k$

(iv) upst. horz. water pressure = $\left(\frac{.44+1.25}{2}\right)(15') = 11^k$

(v) full uplift —

(vi) normal WL uplift = 11.4^k

$$FS = \frac{(0.65)(22.2 + 8.0 - 11.4)}{(11)} + \frac{(0.05 \times 144 \times 71.2)}{15.3} = \frac{172}{11} = 17\pm \quad (ok)$$



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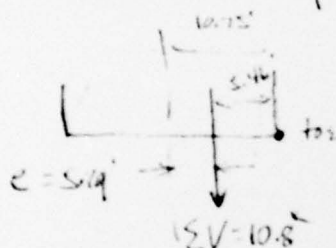
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Estimating Foundation contact stresses at toe and heel

$$I_{x-x} \text{ (moment of inertia) for one-foot wide section of base}$$

$$= \frac{1}{12} b h^3 = \frac{1}{12} (1) (21.5')^3 = 828 \text{ ft}^4$$

(a) WL @ top of dam, 7.5' ice force acting



$$\sigma_{\text{toe}} = \frac{V}{A} + \frac{M_c}{I}$$

$$= \frac{10.8'}{(21.5' \times 1')} + \frac{(10.8' \times 10.75') (21.5')}{(828 \text{ ft}^4)} = 0.50 + 0.74$$

$$= 0.50 + 0.74 = +1.24 \text{ KSF (compression)}$$

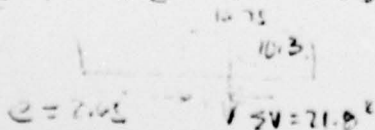
$$\sigma_{\text{heel}} = \frac{V}{A} - \frac{M_c}{I} = 0.50 - 0.74 = -0.24 \text{ KSF (tension)}$$

(b) WL @ $\frac{1}{2}$ PMF elevations

$$\sigma_{\text{toe}} = \frac{V}{A} + \frac{M_c}{I} = \frac{18.9}{21.5} + \frac{(18.9 \times 10.75) (10.75)}{828} = 0.88 + 0.24 = 1.12 \text{ KSF (comp)}$$

$$\sigma_{\text{heel}} = 0.88 - 0.24 = 0.64 \text{ KSF (comp)}$$

(c) WL @ PMF elevations

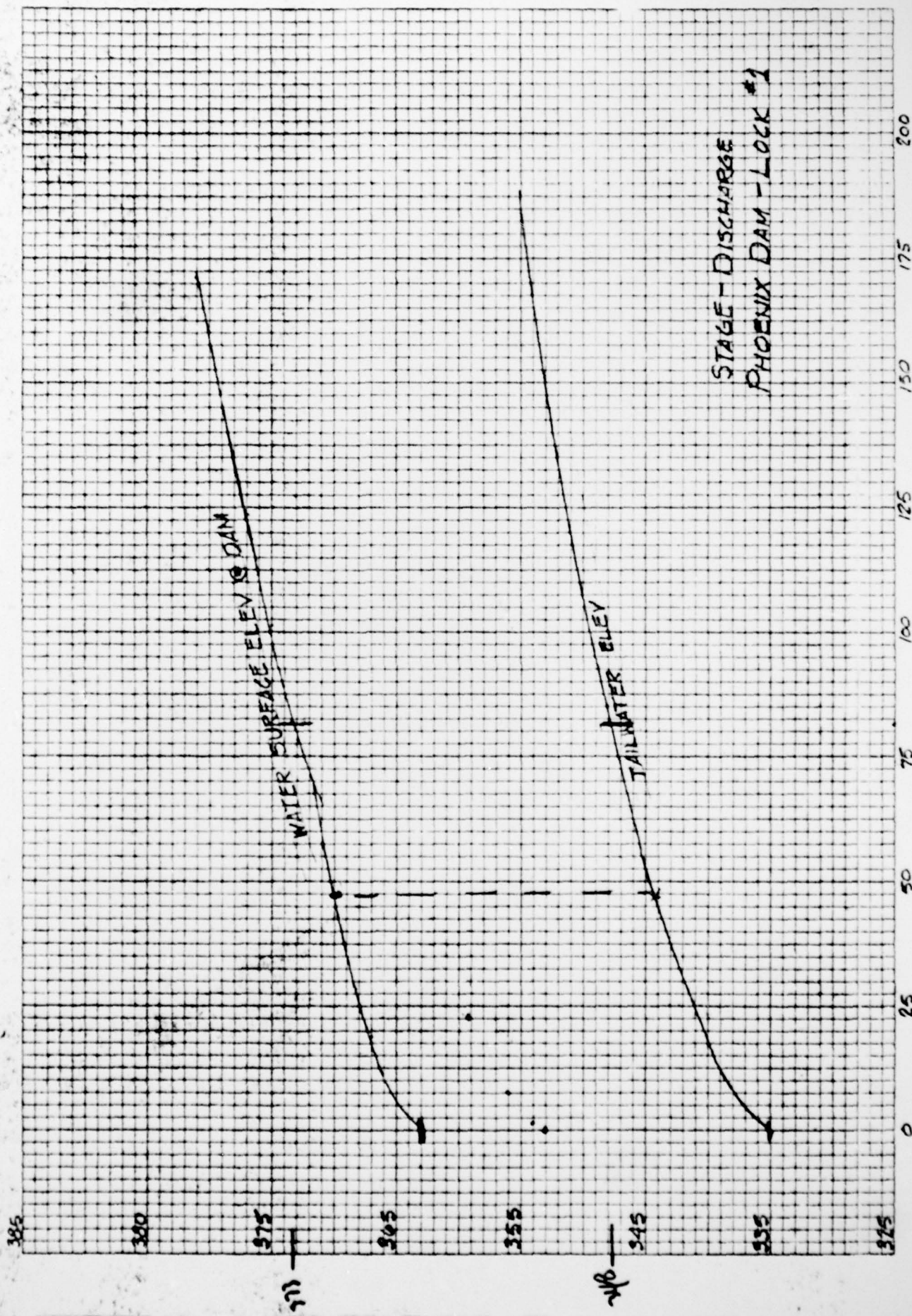


$$\sigma_{\text{toe}} = \frac{V}{A} + \frac{M_c}{I} = \frac{21.8}{21.5} + \frac{(21.8 \times 10.75) (10.75)}{828} = 1.01 + 0.13 = 1.14 \text{ KSF (comp)}$$

$$\sigma_{\text{heel}} = 1.01 - 0.13 = 0.88 \text{ KSF (comp)}$$

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APPENDIX E
REFERENCES

APPENDIX

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